2013 no. 23

AFKONDIGINGSBLAD
VAN
ARUBA

MINISTERIËLE REGELING van 12 maart 2013 tot wijziging van de Regeling vluchtuitvoering (AB 2000 no. 85)

Uitgegeven, 5 april 2013

De minister van Justitie en Onderwijs,

A.L. Dowers

De minister van TOERISME, TRANSPORT en ARBEID,

In overweging genomen hebbende:

dat het in verband met de implementatie van de laatste wijzigingen in de voor Aruba geldende Bijlage 6, Deel 1 van het Verdrag van Chicago (Stb. 1947, H165), alsmede de laatste wijzigingen van JAR-OPS 1 en JAR-OPS 3, het wenselijk is de Regeling vluchtuitvoering (AB 2000 no. 85) aan te passen;

Gelet op:

artikel 10 van de Luchtvaartverordening (AB 1989 no. GT 58);

HEEFT BESLOTEN:

Artikel I

De Regeling vluchtuitvoering (AB 2000 no. 85) wordt gewijzigd als volgt:

A. de bijlage B wordt vervangen door de bij deze ministeriële regeling behorende bijlage B, versie 2.

Artikel II

Deze ministeriële regeling treedt in werking met ingang van de dag na die van zijn plaatsing in het Afkondigingsblad van Aruba.

O.E. Oduber

BIJLAGE B, versie 2

AANVULLINGEN JAR-OPS 1

AUA - OPS 1.001 Applicability (See Appendix 1 to JAR-OPS 1.001)

(a) JAR-OPS 1 For Aruba prescribes requirements applicable to the operation of any civil aeroplane for the purpose of commercial air transportation by any operator whose principal place of business is in Aruba and that has been issued an economical authority in accordance with Article 13 of the Aviation Act of 1989 No. GT 58 and article 3 of the State Decree "Landsbesluit Luchtverkeer" (AB 2000 GT 86). JAR-OPS 1 does not apply to aeroplanes when used in military, customs and police services;

(b) The requirements in JAR-OPS Part 1 are applicable in Aruba as of the day after the date of publication of the Ministerial Decree for flight operations (Regeling Vluchtuitvoering) in the official gazette of Aruba (Afkondigingsblad van Aruba) to all operators as stated in the Ministerial decree – Air Transport (Luchtvervoer);

(c) The requirements in JAR-OPS Part 1 are applicable to all operators in Aruba as of 1 January 1996;

(d) Throughout JAR-OPS 1 For Aruba, “EASA Member State” shall be read and interpretated as “EASA Member State or Aruba”;

(e) Throughout JAR-OPS 1 For Aruba, “Authority” shall be read and interpreted as “Director of Civil Aviation”.

(f) In addition to JAR-1 for Aruba, the following definitions shall apply:

(1) Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

(i) Take-off alternate. An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

(ii) En-route alternate. An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

(iii) Destination alternate. An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

(2) Extended diversion time operations (EDTO). Any operation by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority.

(3) EDTO critical fuel. The fuel quantity necessary to fly to an en-route alternate aerodrome considering, at the most critical point on the route, the most limiting system failure.

(4) EDTO-significant system. An aeroplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning is specifically important to the safe flight and landing of an aeroplane during an EDTO diversion.

(5) Isolated aerodrome. A destination aerodrome for which there is no destination alternate aerodrome suitable for a given aeroplane type.

(6) *Maximum diversion time*. Maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome.

(7) *Point of no return.* The last possible geographic point at which an aeroplane can proceed to the destination aerodrome as well as to an available en route alternate aerodrome for a given flight.

(8) *Threshold time*. The range, expressed in time, established by the Authority to an en-route alternateaerodrome, whereby any time beyond requires an EDTO approval from the Authority.

Appendix 1 to JAR-OPS 1.005(a), item (48)

(48) All single-engine turbine-powered aeroplanes operated at night and/or in IMC shall have an engine trend monitoring system, and those aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2005 shall have an automatic trend monitoring system.

AUA - OPS 1.025 (c)

(c) In addition to paragraph (a) above, an operator shall ensure that flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications as specified in ICAO Annex 1.

AUA-OPS 1.030 (c)

(c) If the aircraft is not registered in Aruba, the Operator shall ensure that the MEL does not affect the aeroplane's compliance with the airworthiness requirements applicable in the State of Registry.

AUA - OPS 1.037 Safety Management

(a) An operator shall implement a safety management system acceptable to the Authority that, as a minimum:
1) identifies safety hazards;
2) ensures the implementation of remedial action necessary to maintain agreed safety performance;
3) provides for continuous monitoring and regular assessment of the safety performance; and
4) aims at a continuous improvement of the overall performance of the safety management system.

(b) The safety management system shall clearly define lines of safety accountability throughout the operator's organization, including a direct accountability for safety on the part of senior management.

(c) The system shall include an occurrence reporting scheme to enable the collation and assessment of relevant incident and accident reports in order to identify adverse trends or to address deficiencies in the interests of flight safety. The scheme shall protect the identity of the reporter and include the possibility that reports may be submitted anonymously. (See AMC OPS 1.037(c))

(d) An operator of an aeroplane of a maximum certificated take-off mass in excess of 27.000 kg shall establish and maintain a flight data analysis programme as part of its safety management system. The flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

(e) The operator shall appoint a person accountable for managing the safety management system. Proposals for corrective action resulting from the safety management system shall be the responsibility of the person accountable for managing the system.

(f) The effectiveness of changes resulting from proposals for of corrective action identified by the safety management system shall be monitored by the Quality Manager.

(g) An operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

(h) An operator shall, as part of its safety management system, assess the level of rescue and fire fighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the aeroplane intended to be used. (See IEM OPS 1.037(g)).

(i) Information related to the level of RFFS protection that is deemed acceptable by the operator shall be contained in the Operations Manual

(j) The requirements in subsections (a), (b), (e) and (f) of this article are furthermore applicable to DCA approved maintenance organizations established in Aruba and maintenance organizations subcontracted by holders of an Aruban AOC.

AUA-OPS 1.125 Documents to be carried
(See Appendix 1 to JAR-OPS 1.125)

(a) An operator shall ensure that the following are carried on each flight:
(1) The Certificate of Registration;
(2) The Certificate of Airworthiness;
(3) The original or a copy of the Noise Certificate (if applicable), including an English translation, where one has been provided by the Authority responsible for issuing the noise certificate;
(4) The original or a certified copy of the Air Operator Certificate, including the operations specifications relevant to the aeroplane type, issued in conjunction with the certificate;
(5) The Aircraft Radio Licence; and
(6) The original or a copy of the Third party liability Insurance Certificate(s), which cover the aeroplane, its crew, passengers and third party liability clauses.

(b) Each flight crew member shall, on each flight, carry a valid flight crew licence with appropriate rating(s) for the purpose of the flight.

AUA - OPS 1.145 Power to inspect

An operator shall ensure that any person authorized by the Authority is permitted at anytime to board and fly in any aeroplane operated in accordance with an AOC issued by the Authority and to enter and remain on the flight deck provided the person has properly identified himself.

AUA - OPS 1.165 Leasing

(a) Terminology

Terms used in this paragraph have the following meaning:

(1) Dry lease - Is when the aeroplane is operated under the AOC of the lessee;

(2) Wet lease - Is when the aeroplane is operated under the AOC of the lessor;

(3) EASA operator - An operator certificated under EU - OPS Part 1 by one of the EASA Member States;

(4) Kingdom operator - An operator certificated by a State within the Kingdom of the Netherlands.

(5) For the application of paragraph (c)(1)(ii), (c)(2)(ii), (d)(1)(ii) and (d)(2)(ii), each period or interval shall be considered to start from the first day of the first lease accountable for that 12 months period or interval.

(b) General

(1) All leases require prior approval from the Authority. Any conditions which are part of this approval must be included in the lease agreement.

(2) All associated conditions and/or limitations imposed by the Authority shall be complied with.

(3) All wet leases:

An Aruban operator shall not wet lease-in or wet lease-out an aeroplane in any of the following situations:

(i) If there is evidence or reasonable doubt that the State of Lessor or State of Lessee, as applicable, does not provide an adequate level of safety oversight;

(ii) If there is evidence or reasonable doubt that the safety standards of the lessor or lessee, as applicable, with respect to maintenance and operations are not equivalent to the Aruban operator;

(iii) If the type and scope of operation intended under the lease differs significantly from the type and scope of operation the Aruban operator is authorized by the Authority to conduct;

(iv) If the intended lease is the sole operation of the Aruban operator involved.

(c) Wet-leasing of aeroplanes between Aruban operators, or between Aruban operators and EASA or Kingdom operators

(1) Wet lease-in

(i) Those elements of lease agreements which are approved by the Authority, other than lease agreements in which an aeroplane and complete crew are involved and no transfer of functions and responsibilities is intended, are all to be regarded, with respect to the leased aeroplane, as variations of the AOC under which the flights will be operated.

(ii) An Aruban operator shall not conduct a specific wet lease-in operation for more than six months within a 12 months period or interval.

(2) Wet lease-out

(i) An Aruban operator providing an aeroplane and complete crew to another Aruban operator, EASA operator, or Kingdom operator and retaining all the functions and responsibilities prescribed in Subpart C, shall remain the operator of the aeroplane.

(ii) An Aruban operator shall not wet lease-out an aeroplane for more than six months within a 12 months period or interval.

(d) Wet-leasing of aeroplanes between an Aruban and any entity other than an Aruban, EASA or Kingdom operator

(1) Wet lease-in

(i) Those elements of lease agreements which are approved by the Authority, other than lease agreements in which an aeroplane and complete crew are involved and no transfer of functions and responsibilities is intended, are all to be regarded, with respect to the leased aeroplane, as variations of the AOC under which the flights will be operated.

(ii) An Aruban operator shall not conduct a specific wet lease-in operation for more than three months within a 12 months period or interval.

(iii) An Aruban operator shall ensure that, with regard to aeroplanes that are wet leased-in:

(A) The safety standards of the lessor with respect to maintenance and operations are equivalent those applicable in Aruba;

(B) The lessor is an operator holding an AOC issued by a State, which is a signatory to the Chicago Convention, that has a level of safety oversight acceptable to the Authority and that is equivalent to the level of safety oversight in Aruba;

(C) The aeroplane has a standard Certificate of Airworthiness issued in accordance with ICAO Annex 8. Standard Certificates of Airworthiness issued by an EASA Member State or a State with equivalent standard, acceptable to the authority, other than the State responsible for issuing the AOC, will be accepted when issued in accordance with EASA Part 21 or equivalent; and

(D) Any Aruban requirement made applicable by the lessee's Authority is complied with.

(2) Wet lease-out

(i) An Aruban operator providing an aeroplane and complete crew to another entity and retaining all

the functions and responsibilities prescribed in Subpart C, shall remain the operator of the aeroplane.

(ii) An Aruban operator shall not wet lease-out an aeroplane for more than six months within a 12 months period or interval.

(e) Dry leases

(1) All dry leases

Those elements of lease agreements which are approved by the Authority, other than lease agreements in which an aeroplane and complete crew are involved and no transfer of functions and responsibilities is intended, are all to be regarded, with respect to the leased aeroplane, as variations of the AOC under which the flights will be operated.

(2) Dry lease-in

An Aruban operator shall ensure that, with regard to aeroplanes that are dry leased-in, compliance with Subparts K, L, S, and JAR-26 is ensured.

(3) Dry lease-out

(i) An Aruban operator may dry lease-out an aeroplane for the purpose of commercial air transportation to any operator of a State which is signatory to the Chicago Convention, provided that the following conditions are met:

(A) The Authority has exempted the Aruban operator from the relevant provisions of JAR - OPS Part 1 for Aruba and, after the foreign regulatory authority has accepted responsibility in writing for surveillance of the maintenance and operation of the aeroplanes, has removed the aeroplane from its AOC; and

(B) The aeroplane is maintained according to an approved maintenance programme.

AUA–OPS 1.175 General rules for Air Operator Certification

Note 1: Appendix 1 to this paragraph specifies the contents and conditions of the AOC.
Note 2: Appendix 2 to this paragraph specifies the management and organisation requirements.

(a) An operator shall not operate an aeroplane for the purpose of commercial air transportation otherwise than under, and in accordance with, the terms and conditions of an Air Operator Certificate (AOC) and operations specifications.

(b) An applicant for an AOC, or variation of an AOC, shall allow the Authority to examine all safety aspects of the proposed operation.

(c) An applicant for an AOC must:

1. Not hold an AOC issued by another Authority;
2. Have his principal place of business and, if any, his registered office located in Aruba; (See IEM OPS 1.175(c)(2));
3. Have registered the aeroplanes which are to be operated under the AOC in Aruba; and
4. Satisfy the Authority that he is able to conduct safe operations.

(d) Notwithstanding sub-paragraph (c)(3) above, an operator may operate, with the mutual agreement of the Authority issuing the AOC and another Authority, aeroplanes registered on the national register of the second-named Authority.

(e) An operator shall grant the Authority access to his organisation and aeroplanes and shall ensure that, with respect to maintenance, access is granted to any associated subcontracted maintenance organisation, to determine continued compliance with JAR–OPS 1 for Aruba.

(f) An AOC will be varied, suspended or revoked if the Authority is no longer satisfied that the operator can maintain safe operations.

(g) The operator must satisfy the Authority that;

1. Its organisation and management are suitable and properly matched to the scale and scope of the operation; and
2. Procedures for the supervision of operations have been defined.

(h) The operator must have nominated an accountable manager acceptable to the Authority who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority. (See ACJ OPS 1.035)

(i) The operator must have nominated post holders, acceptable to the Authority, who are responsible for the management and supervision of the following areas,

(1) Flight operations;
(2) The maintenance system;
(3) Crew training; and
(4) Ground operations. (See ACJ OPS 1.175(i))

(j) A Person may hold more than one of the nominated posts if acceptable to the Authority but, for operators who employ 21 or more full time staff, a minimum of two persons are required to cover the four areas of responsibility. (See ACJ OPS 1.175(j)& (k).)

(k) For operators who employ 20 or less full time staff, one or more of the nominated posts may be filled by the accountable manager if acceptable to the Authority. (See ACJ OPS 1.175(j) & (k).)

(l) The operator must ensure that every flight is conducted in accordance with the provisions of the Operations Manual.

(m) The operator must arrange appropriate ground handling facilities to ensure the safe handling of its flights.

(n) The operator must ensure that its aeroplanes are equipped and its crews are qualified, as required for the area and type of operation.

(o) The operator must comply with the maintenance requirements, in accordance with Subpart M, for all aeroplanes operated under the terms of its AOC.

(p) The operator must provide the Authority with a copy of the Operations Manual, as specified in Subpart P and all amendments or revisions to it.

(q) The operator must maintain operational support facilities at the main operating base, appropriate for the area and type of operation.

(r) The operator shall meet and maintain the requirements established by the States in which the operations are conducted.

(s) The air operator certificate shall authorize the operator to conduct commercial air transport operations in accordance with the operations specifications.

Appendix 2 to AUA-OPS 1.175

The management and organization of an AOC holder

(a) General

(1) An operator must have a sound and effective management structure in order to ensure the safe conduct of air operations. Nominated post holders must have proven competency in civil aviation.

(2) In the context of this appendix, 'competency' means that an individual must have a technical qualification and managerial experience acceptable to the Authority, as appropriate.

(b) Nominated post holders

(1) A description of the functions and the responsibilities of the nominated post holders,including their names, must be contained in the Operations Manual and the Authority must be given notice in writing of any intended or actual change in appointments or functions.

(2) The operator must make arrangements to ensure continuity of supervision in the absence of nominated post holders.

(3) The operator must satisfy the Authority that the management organization is suitable and properly matched to the operating network and scale of operation.

(4) A person nominated as a post holder by the holder of an AOC must not be nominated as a post holder of any other AOC, unless acceptable to the Authority. Nominated post holders must be contracted to work sufficient hours such that the individual can fulfil the management functions associated with the size and scope of the operator's business.

(5) More than one of the nominated posts may be filled by one person if acceptable to the Authority.

(6) All Management personnel required by JAR-OPS 1 for Aruba subpart C shall establish their primary place of residence in Aruba and demonstrate sufficient presence to assume continuity of their responsibilities.

Note: The requirements relating to the appointment of the nominated post holder responsible for the maintenance system in accordance with JAR-OPS 1.175(i)(2) are prescribed in JAR-OPS 1.895.

c) Adequacy and supervision of staff

(1) Crew members

The operator must employ sufficient flight and cabin crew for the planned operation, trained and checked in accordance with Subpart N and Subpart O as appropriate.

(2) Ground staff

(i) The number of ground staff is dependent upon the nature and the scale of operations. Operations and ground handling departments, in particular, must be staffed by trained personnel who have a thorough understanding of their responsibilities within the organization.

(ii) An operator contracting other organizations to provide certain services, retains responsibility for the maintenance of proper standards. In such circumstances, a nominated post holder must be given the task of ensuring that any contractor employed meets the required standard.

(3) Supervision

(i) The numbers of supervisors to be appointed is dependent upon the structure of the operator and the number of staff employed. The duties and responsibilities of these supervisors must be defined, and any flying commitments arranged so that they can discharge their supervisory responsibilities.

(ii) The supervision of all crew members must be exercised by individuals possessing experience and personal qualities sufficient to ensure the attainment of the standards specified in the Operations Manual.

(d) Accommodation facilities

(1) An operator must ensure that working space available at each operating base is sufficient for personnel pertaining to the safety of flight operations. Consideration must be given to the needs of ground staff, those concerned with operational control, the storage and display of essential records, and flight planning by crews.

(2) Office services must be capable, without delay, of distributing operational instructions and other information to all concerned.

(e) Documentation

The operator must make arrangements for the production of manuals, amendments and other documentation.

AUA-OPS 1.180 Issue, variation and continued validity of an AOC

(a) An operator will not be granted an AOC or a variation to an AOC, and that AOC will not remain valid unless:

(1) Aeroplanes operated have a standard Certificate of Airworthiness issued in accordance with the Aruban Airworthiness code;

(2) The maintenance system has been approved by the Authority in accordance with Subpart M; and

(3) The operator has satisfied the Authority that he has the ability to:

(i) Establish and maintain an adequate organization;

(ii) Establish and maintain a quality system in accordance with JAR-OPS 1.035;

(iii) Comply with the required training programmes;
(iv) Comply with the maintenance requirements, consistent with the nature and extent of the operations specified, including the relevant items described in JAR-OPS 1.175 (g) to (o); and
(v) Comply with JAR-OPS 1.175.
(vi) Demonstrate ground handling arrangements consistent with the nature and extent of the operations, acceptable to the Authority.

(4) The operator has at least one aircraft operating under the AOC and under operational control of the operator.

(b) Notwithstanding the provisions of JAR-OPS 1,185(f), the operator must notify the Authority as soon as practicable of any changes to the information submitted in accordance with JAR-OPS 1.185 (a).

(c) If the Authority is not satisfied that the requirements of subparagraph (a) above have been met, the Authority may require the conduct of one or more demonstration flights, operated as if they were commercial air transport flights.

AUA-OPS 1.195 Operational Control (See AMC OPS 1.195)

(a) An operator shall:
(1) Establish and maintain a method of exercising operational control approved by the Authority; and
(2) Exercise operational control over any flight operated under the terms of his AOC.

(b) Responsibility for operational control shall be only delegated to the pilot-in-command, or if the operator's approved method of control and supervision of flight operation incorporates the use of flight operations officer/flight dispatcher personnel, to the pilot in command and to a flight operations officer/flight dispatcher.

(c) If the operator's approved method of control and supervision of flight operation includes the use of flight operations officer/flight dispatcher (in accordance with JAR-OPS 1.180), the flight operations officer/flight dispatcher shall:
(1) assist the pilot-in-command in flight preparation and provide the relevant information;
(2) assist the pilot-in-command in preparing the operational and ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit; and
(3) furnish the pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.

AUA-OPS 1.210 Establishment of procedures

(a) An operator shall establish procedures and instructions, for each aeroplane type, containing ground staff and crew members' duties for all types of operation on the ground and in flight. (See AMC OPS 1.210(a).)

(b) An operator shall establish a check-list system to be used by crew members for all phases of operation of the aeroplane under normal, abnormal and emergency conditions as applicable, to ensure compliance with the operating procedures contained in the Operations Manual and the aeroplane flight manual or other documents associated with the Certificate of Airworthiness and otherwise in the operations manual, are followed. The design and utilization of checklists shall observe human factors principles. (See IEM OPS 1.210 (b).)

(c) An operator shall not require a crewmember to perform any activities during critical phases of the flight other than those required for the safe operation of the aeroplane. (See JAR-OPS1.192.)

AUA-OPS 1.245 Requirements for extended diversion time operations (EDTO) (See Appendix 1 to AUA-OPS 1.245)

a) Unless the operation has been specifically approved by the Authority, an aeroplane with two or more turbine engines shall not be operated on a route where the diversion time from any point on the route, calculated in ISA and still air conditions at the one-engine inoperative cruise speed for aeroplanes with two turbine engines and at the all-engine operating cruise speed for aeroplanes with more than two turbine engines, to an en-route alternate aerodrome exceeds a threshold time established for such operations by that Authority.

b) The maximum diversion time, for an operator of a particular aeroplane type engaged in extended diversion time operations shall be approved by the Authority.
Note 1.— Guidance on the conditions to be used when converting diversion times to distances are contained in Appendix 1 to AUA-OPS 1.245.
Note 2.— EDTO may be referred to as ETOPS in some documents.

c) The Authority may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operations beyond the time limits of the most time-limited system. The specific safety risk assessment shall include at least the:
a) capabilities of the operator;
b) overall reliability of the aeroplane;

c) reliability of each time limited system;
d) relevant information from the aeroplane manufacturer; and
e) specific mitigation measures.
Note.— Guidance for the specific safety risk assessment is contained in Appendix 1 to AUA-OPS 1.245.

d) For aeroplanes engaged in EDTO, the additional fuel required by AUA-OPS 1.255(c) (3)(iv)(2) shall include the fuel necessary to comply with the EDTO critical fuel scenario as established by the Authority.
Note.— Guidance on compliance with the requirements of this provision is in Appendix 1 to AUA-OPS 1.245.

e) A flight shall not proceed beyond the threshold time in accordance with AUA-OPS 1.245(a) unless the identified en-route alternate aerodromes have been re-evaluated for availability and the most up to date information indicates that, during the estimated time of use, conditions at those aerodromes will be at or above the operator's established aerodrome operating minima for the operation. If any conditions are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action shall be determined.

AUA-OPS 1.246 Additional requirements for operations by aeroplanes with turbine engines beyond 60 minutes to an en-route alternate aerodrome including extended diversion time operations (EDTO)

a) Operators conducting operations beyond 60 minutes, from a point on a route to an en-route alternate aerodrome shall ensure that:
(1) for all aeroplanes:
i) en-route alternate aerodromes are identified; and
ii) the most up-to-date information is provided to the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions;
(2) for aeroplanes with two turbine engines, the most up-to-date information provided to the flight crew indicates that conditions at identified en-route alternate aerodromes will be at or above the operator's established aerodrome operating minima for the operation at the estimated time of use.

b) In addition to the requirements in AUA-OPS 1.246(a), all operators shall ensure that the following are taken into account and provide the overall level of safety intended by the provisions of JAR-OPS 1 for Aruba:
1) operational control and flight dispatch procedures;
2) operating procedures; and
3) training programmes.

(c) Prior to conducting an EDTO flight, an operator shall ensure that a suitable EDTO en-route alternate is available, within either the approved diversion time or a diversion time based on the MEL generated serviceability status of the aeroplane, whichever is shorter. (See also JAR-OPS 1.297(d).)

(d) En-route alternate aerodromes, required by JAR-OPS 1.246(b) for extended diversion time operations by aeroplanes with two turbine engines, shall be selected and specified in the operational and air traffic services (ATS) flight plans.

AUA-OPS 1.255 (b)(c)(d)

(b) An operator shall ensure that the planning of flights is at least based upon (1) and (2) below:
(1) Procedures contained in the Operations Manual and data derived from:
(i) Data provided by the aeroplane manufacturer; or
(ii) Current aeroplane specific data derived from a fuel consumption monitoring system.
(2) The operating conditions under which the flight is to be conducted including:
(i) Realistic aeroplane fuel consumption data;
(ii) Anticipated masses;
(iii) Expected meteorological conditions;
(iv) Air Navigation Services Provider(s) procedures and restrictions;
(v) Notices to Airmen; and
(vi) The effects of deferred maintenance items and/or configuration deviations.

(c) An operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes:
(1) *Taxi fuel*, which shall be the amount of fuel expected to be consumed before take-off;
(2) *Trip fuel*, which shall be the amount of fuel required to enable the aeroplane to fly from take-off or the point of in-flight re-planning until landing at the destination aerodrome taking into account the operating conditions of AUA-OPS 1.255(b)(2);
(3) *Reserve fuel* consisting of:
(i) *contingency fuel*, which shall be the amount of fuel required to compenate for unforeseen factors. It shall be 5 per cent of the planned trip fuel or of the fuel required from the point of in flight re-planning based on the consumption rate used to plan the trip but in any case shall not be lower than the amount

required to fly for five minutes at holding speed at 450 m (1500 ft.) above the destination aerodrome in standard conditions;

(ii) *destination alternate fuel*, which shall be:

1) where a destination alternate aerodrome is required, the amount of fuel required to enable the aeroplane to:

a) perform a missed approach at the destination aerodrome;

b) climb to the expected cruising altitude;

c) fly the expected routing;

d) descend to the point where the expected approach is initiated; and

e) conduct the approach and landing at the destination alternate aerodrome; or

2) where two destination alternate aerodromes are required, the amount of fuel, as calculated in AUA-OPS 1.255(c)(3)(ii)(1), required to enable the aeroplane to proceed to the destination alternate aerodrome which requires the greater amount of alternate fuel; or

3) where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the aeroplane to fly for 15 minutes at holding speed at 450 m (1 500 ft) above destination aerodrome elevation in standard conditions; or

4) where the aerodrome of intended landing is an isolated aerodrome:

a) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes plus 15 per cent of the flight time planned to be spent at cruising level, including final reserve fuel, or two hours, whichever is less; or

b) for a turbine engine aeroplane, the amount of fuel required to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel;

iii) *final reserve fuel*, which shall be the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required:

1) for a reciprocating engine aeroplane,the amount of fuel required to fly for 45minutes, under speed and altitude conditions specified by the Authority; or

2) for a turbine engine aeroplane, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions;

iv) *additional fuel*, which shall be the supplementary amount of fuel required if the minimum fuel calculated in accordance with AUA-OPS 1.255 (c)(1)(2)(3)(i), (ii) and (iii) is not sufficient to**:**

1) allow the aeroplane to descend as necessary and proceed to an alternate aerodrome in the event of engine failure or loss of pressurization, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route;

a) fly for 15 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions; and

b) make an approach and landing;

2) allow an aeroplane engaged in EDTO to comply with the EDTO critical fuel scenario as established by the Authority;

3) meet additional requirements not covered above;

4) *Discretionary fuel*, which shall be the extra amount of fuel to be carried at the discretion of the pilot-in-command.

(d) An operator shall ensure that in-flight replanning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination aerodrome other than originally planned includes:

(1) Trip fuel for the remainder of the flight; and

(2) *Reserve fuel* consisting of:

(i) *Contingency fuel*; and

(ii) *Destination Alternate fuel*, if a destination alternate aerodrome is required. (This does not preclude selection of the departure aerodrome as the destination alternate aerodrome); and

(iii) *Final reserve fuel*; and

(iv) *Additional fuel*, if required by the type of operation (e.g. EDTO); and

(3) *Discretionary fuel*.

e) Notwithstanding the provisions in AUA-OPS 1.255 (b)(c) and (d); the Authority may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve variations to the pre-flight fuel calculation of taxi fuel, trip fuel, contingency fuel, destination alternate fuel, and additional fuel. The specific safety risk assessment shall include at least the:

1) flight fuel calculations;

2) capabilities of the operator to include:

i) a data-driven method that includes a fuel consumption monitoring programme; and/or

ii) the advanced use of alternate aerodromes; and

3) specific mitigation measures.

AUA-OPS 1.285 Passenger briefing

An operator shall ensure that:

(a) General.

(1) Passengers are given a verbal briefing about safety matters. Parts or all of the briefing may be provided by an audio-visual presentation.

(2) Passengers are provided with a safety briefing card on which picture type instructions indicate the operation of emergency equipment and exits likely to be used by passengers.

(b) Before take-off

(1) Passengers are briefed on the following items if applicable:

(i) Smoking regulations;

(ii) Back of the seat to be in the upright position and tray table stowed;

(iii) Location of emergency exits;

(iv) Location and use of floor proximity escape path markings;

(v) Stowage of hand baggage;

(vi) Restrictions on the use of portable electronic devices; and

(vii) The location and the contents of the safety briefing card, and,

(2) Passengers receive a demonstration of the following:

(i) The use of safety belts and/or safety harnesses, including how to fasten and unfasten the safety belts and/or safety harnesses;

(ii) The location and use of oxygen equipment if required (JAR-OPS 1.770 and JAR-OPS 1.775 refer). Passengers must also be briefed to extinguish all smoking materials when oxygen is being used; and

(iii) The location and use of life jackets if required (JAR-OPS 1.825 refers).

(c) After take-off

(1) Passengers are reminded of the following if applicable:

(i) Smoking regulations; and

(ii) Use of safety belts and/or safety harnesses.

(d) Before landing

(1) Passengers are reminded of the following if applicable:

(i) Smoking regulations;

(ii) Use of safety belts and/or safety harnesses;

(iii) Back of the seat to be in the upright position and tray table stowed;

(iv) Re-stowage of hand baggage; and

(v) Restrictions on the use of portable electronic devices.

(e) After landing

(1) Passengers are reminded of the following:

(i) Smoking regulations; and

(ii) Use of safety belts and/or safety harnesses.

(f) The operator shall ensure that, during take-off and landing and whenever considered necessary by reason of turbulence or any emergency occurring during flight, all passengers on board an aeroplane shall be secured in their seats by means of the seat belts or harnesses provided.

(g) In an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

AUA-OPS 1.295(b)(c)(d)(e) and (f)

(b) A take-off alternate aerodrome shall be selected if either the weather meteorological conditions at the aerodrome of departure are at or below the applicable operator's established aerodrome operating landing minima for that operation or if it would not be possible to return to the aerodrome of departure for other reasons. The take-off alternate aerodrome shall be located within the following flight time distance from the aerodrome of departure:

(1) for aeroplanes with two engines, one hour of flight time at a one-engine-inoperative cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(2) for aeroplanes with three or more engines, two hours of flight time at an all-engine operating cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(3) for aeroplanes engaged in extended diversion time operations (EDTO) where an alternate aerodrome meeting the distance criteria of a) or b) is not available, the first available alternate aerodrome located within the distance of the operator's approved maximum diversion time considering the actual take-off mass.

(c) An operator must select at least one destination alternate for each IFR flight unless:
(1) both:
(i) The duration of the planned flight from take-off to landing or, in the event of in-flight re-planning in accordance with JAR-OPS 1.255(d), the remaining flying time to destination does not exceed six hours, and
(ii) The duration of the flight from the departure aerodrome, or from the point of in-flight re-planning to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that:
- the approach and landing may be made under visual meteorological conditions; and
- separate runways are available and usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure; or
(2) the aerodrome is isolated. Operations into isolated aerodromes do not require the selection of a destination alternate aerodrome(s) and shall be planned in accordance with AUA-OPS 1.255 (c)(3)(ii)(4);
i) for each flight into an isolated aerodrome a point of no return shall be determined; and
ii) a flight to be conducted to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic, and other operational conditions indicate that a safe landing can be made at the estimated time of use.

(d) Two destination alternate aerodromes shall be selected when, for the destination aerodrome:
(1) The appropriate weather reports or forecasts, or any combination thereof, indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival, the weather conditions will be below the operator's established aerodrome operating minima for that operation; or
(2) No meteorological information is available.

(e) An operator shall specify any required alternate(s) in the operational and ATS flight plan.

(f) Notwithstanding the provisions in JAR-OPS 1.295 (a) and AUA-OPS 1.295 (a) through (e); the Authority may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the:
(1) capabilities of the operator;
(2) overall capability of the aeroplane and its systems;
(3) available aerodrome technologies, capabilities and infrastructure;
(4) quality and reliability of meteorological information;
(5) identified hazards and safety risks associated with each alternate aerodrome variation; and
(6) specific mitigation measures.

AUA-OPS 1.297(a)

(a) An operator shall only select an aerodrome as a take-off alternate aerodrome when the appropriate weather reports or forecasts or any combination thereof indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the operator's established landing minima specified in accordance with JAR-OPS 1.225. The ceiling must be taken into account when the only approaches available are non-precision and/or circling approaches. Any limitation related to one engine inoperative operations must be taken into account.

AUA-OPS 1.320 Seats, safety belts and harnesses

(a) Crew members
(1) During take-off and landing, and whenever deemed necessary by the commander in the interest of safety, each crew member shall be properly secured by all safety belts and harnesses provided;
(2) During other phases of the flight each flight crew member on the flight deck shall keep his safety belt fastened while at his station.

(b) Passengers
(1) Before take-off and landing, and during taxying, and whenever deemed necessary in the interest of safety, the commander shall ensure that each passenger on board occupies a seat or berth with his safety belt, or harness where provided, properly secured.
(2) An operator shall make provision for, and the commander shall ensure that multiple occupancy of aeroplane seats may only be allowed on specifies seats and does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

(c) Cockpit observer seat
1. Except as provided in paragraph (3) of this section, each operator shall make available a seat on the flight deck of each aeroplane for occupancy by the Authority while conducting en route inspections. The location and equipment of the seat, with respect to its suitability for use in conducting en route inspections, is deter-

mined by the Authority.
2. In each aeroplane that has more than one observer seat, in addition to the seats required for the crew complement for which the aeroplane was certificated, the observer seat selected by the Authority must be made available when complying with paragraph (a) above.
3. For any aeroplane type certificated before December 20, 1995 for not more than 30 passengers that does not have an observers seat on the flight deck, the operator must provide a forward passenger seat with headset or speaker for occupancy by the Authority. The cockpit door, if required, may remain open during such inspections.

AUA-OPS 1.340 Meteorological Conditions

(a) On an IFR flight a commander shall only:
(1) Commence take-off; or
(2) Continue beyond the point from which a revised flight plan applies in the event of in-flight re-planning, when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) prescribed in JAR/AUA-OPS 1.295 are at or above the planning minima, prescribed in JAR/AUA-OPS 1.297.
(b) On an IFR flight, a commander shall only continue towards the planned destination aerodrome when the latest information available indicates that, at the expected time of arrival, the weather conditions at the destination, or at least one destination alternate aerodrome, are at or above the operator's established aerodrome operating minima.
(c) On an IFR flight a commander shall only continue beyond:
(1) The decision point when using the Reduced Contingency Fuel Procedure (See Appendix 1 to JAR-OPS 1.255 paragraph (b)), or
(2) The pre-determined point when using the pre-determined point procedure (See Appendix 1 to JAR-OPS 1.255 paragraph (c)), when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) prescribed in JAR-OPS 1.295 are at or above the operator's established aerodrome operating minima prescribed in JAR-OPS 1.225.
(d) A flight to be conducted in accordance with the visual flight rules shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under the visual flight rules will, at the appropriate time, be such as to enable compliance with these rules.
(e) (1) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome, the operator shall specify appropriate incremental values, acceptable to the Authority, for height of cloud base and visibility to be added to the operator's established aerodrome operating minima.
(2) The Authority shall approve a margin of time established by the operator for the estimated time of use of an aerodrome.

AUA-OPS 1.350 Fuel and oil supply

(a) A commander shall only commence a flight or continue from the point of in-flight re-planning when he is satisfied that the aeroplane carries at least the planned amount of fuel in accordance with AUA-OPS 1.255 and the planned amount of oil to complete the flight safely, taking into account the expected operating conditions.
(b) (1) The operator shall maintain fuel and oil records to enable the Authority to ascertain that, for each flight, the requirements of AUA-OPS 1.255 & 1.350 have been complied with.
(2) The operator shall maintain oil records to enable the Authority to ascertain that trends for oil consumption are such that an aeroplane has sufficient oil to complete each flight.

AUA-OPS 1.375 In-flight fuel management

An operator must establish a procedure, approved by the Authority, to ensure that in-flight fuel checks and fuel management are carried out according to following criteria:
(a) In-flight fuel checks.
(1) A commander must ensure that fuel checks are carried out in-flight at regular intervals. The usable remaining fuel must be recorded and evaluated to:
(i) compare actual consumption with planned consumption;
(ii) check that the usable remaining fuel is sufficient to complete the flight, in accordance with paragraph (b) 'In-flight fuel management' below; and
(iii) determine the expected usable fuel remaining on arrival at the destination aerodrome.

(2) The relevant fuel data must be recorded.

(b) In-flight fuel management.

(1) The flight must be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:

(i) the required alternate fuel plus final reserve fuel, or

(ii) the final reserve fuel if no alternate aerodrome is required

(2) However, if, as a result of an in-flight fuel check, the expected usable fuel remaining on arrival at the destination aerodrome is less than:

(i) the required alternate fuel plus final reserve fuel, the commander shall request delay information from ATC and take into account the traffic and the operational conditions prevailing at the destination aerodrome, at the destination alternate aerodrome and at any other adequate aerodrome, in deciding whether to proceed to the destination aerodrome or to divert so as to perform a safe landing with not less than final reserve fuel, or

(ii) the final reserve fuel if no alternate aerodrome is required, the commander must take appropriate action and proceed to an adequate aerodrome so as to perform a safe landing with not less than final reserve fuel.

(3) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

(4) The commander shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when calculated usable fuel on landing, at the nearest adequate aerodrome where a safe landing can be performed, is less than the planned final reserve fuel.

(5) Additional conditions for specific procedures.

(i) On a flight using the RCF procedure, in order to proceed to the Destination 1 aerodrome, the commander must ensure that the usable fuel remaining at the decision point is at least the total of:

(A) Trip fuel from the decision point to the Destination 1 aerodrome; and

(B) Contingency fuel equal to 5% of trip fuel from the decision point to the Destination 1 aerodrome; and

(C) Destination 1 aerodrome alternate fuel, if a Destination 1 alternate aerodrome is required; and

(D) Final reserve fuel

(ii) On a flight using the PDP procedure in order to proceed to the destination aerodrome, the commander must ensure that the usable fuel remaining at the PDP is at least the total of:

(A) Trip fuel from the PDP to the destination aerodrome; and

(B) Contingency fuel from the PDP to the destination aerodrome calculated in accordance with Paragraph (a)(3) of Appendix 1 to JAR-OPS 1.255; and

(C) Fuel required according to Paragraph (c)(1)(iv) of Appendix 1 to JAR-OPS 1.255.

AUA-OPS 1.425 Emergency situation

(a) If an emergency situation which endangers the safety of the aeroplane or persons becomes known first to the flight operations officer/flight dispatcher (if the operator's approved method of control and supervision of flight operation includes the use of flight operations officer/flight dispatcher), action by that person in accordance with paragraph (b) below shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required.

(b) In the event of an emergency, a flight operations officer/flight dispatcher shall:

(1) initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and

(2) convey safety-related information to the pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

(c) If an emergency situation which endangers the safety of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures, the commander shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the commander shall submit a report on any such violation to the appropriate authority of such State; in that event, the commander shall also submit a copy of it to the Authority. Such reports shall be submitted as soon as possible and normally within ten days.

AUA-OPS 1.430 Aerodrome Operating Minima – General
(See Appendix 1 to AUA-OPS 1.430)

(a) (1) An operator shall establish, for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in Appendix 1. The method of determination of such minima must be acceptable to the Authority. Such minima shall not be lower than any that may be established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State. The use of HUD, HUDLS or EVS may allow operations with lower visibilities than normally associated with the aerodrome operating minima. States which promulgate aerodrome operating minima may also promulgate regulations for reduced visibility minima associated with the use of HUD or EVS.
(2) Notwithstanding paragraph (a)(1) above, in-flight calculation of minima for use at unplanned alternate aerodromes and/or for approaches utilising EVS shall be carried out in accordance with a method acceptable to the Authority.

(b) In establishing the aerodrome operating minima which will apply to any particular operation, an operator must take full account of:
(1) the type, performance and handling characteristics of the aeroplane;
(2) the composition of the flight crew, their competence and experience;
(3) the dimensions and characteristics of the runways which may be selected for use;
(4) the adequacy and performance of the available visual and non-visual ground aids; (See Appendix 1 to AUA-OPS 1.430 Table 6a)**.**
(5) the equipment available on the aeroplane for the purpose of navigation and/or control of the flight path, as appropriate, during the take-off, the approach, the flare, the landing, roll-out and the missed approach;
(6) the obstacles in the approach, missed approach and the climb-out areas required for the execution of contingency procedures and necessary clearance;
(7) the obstacle clearance altitude/height for the instrument approach procedures;
(8) the means to determine and report meteorological conditions; and
(9) the flight technique to be used during the final approach.

(c) The aeroplane categories referred to in this Subpart must be derived in accordance with the method given in Appendix 2 to AUA-OPS 1.430(c).

(d) (1) All approaches shall be flown as stabilised approaches (SAp) unless otherwise approved by the Authority for a particular approach to a particular runway.
(2) All non-precision approaches shall be flown using the continuous descent final approaches (CDFA) technique unless otherwise approved by the Authority for a particular approach to a particular runway. When calculating the minima in accordance with Appendix 1, the operator shall ensure that the applicable minimum RVR is increased by 200 metres (m) for Cat A/B aeroplanes and by 400 m for Cat C/D aeroplanes for approaches not flown using the CDFA technique, providing that the resulting RVR/CMV value does not exceed 5 000 m.
(3) Notwithstanding the requirements in (d)(2) above, the Authority may exempt an operator from the requirement to increase the RVR when not applying the CDFA technique.
(4) Exemptions as described in paragraph (d)(3) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator's experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals and must be terminated as soon as facilities are improved to allow application of the CDFA technique.

(e) (1) An operator must ensure that Appendix 1 to AUA-OPS 1.430 is applied.
(2) Notwithstanding the requirements in (e)(1) above, the Authority may exempt an operator from the requirement to increase the RVR above 1 500 m (Cat A/B aeroplanes) or above 2 400 m (Cat C/D aeroplanes), when approving an operation to a particular runway where it is not practicable to fly an approach using the CDFA technique or where the criteria in paragraph (c) of Appendix 1 to AUA-OPS 1.430 cannot be met.
(3) Exemptions as described in paragraph (e)(2) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator's experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals and must be terminated as soon as facilities are improved to allow application of the CDFA technique.

AUA-OPS 1.435 Terminology

(a) Terms used in this Subpart have the following meaning:

(1) *Circling.* The visual phase of an instrument approach to bring an aircraft into position for landing on a runway which is not suitably located for a straight-in approach.
(2) *Low Visibility Procedures (LVP).* Procedures applied at an aerodrome for the purpose of ensuring safe operations during Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and low visibility take-offs.

(3) *Low Visibility Take-Off (LVTO).* A take-off where the Runway Visual Range (RVR) is less than 400 m.
(4) *Flight control system.* A system which includes an automatic landing system and/or a hybrid landing system.
(5) *Fail-Passive flight control system.* A flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the aeroplane after a failure.
(6) *Fail-Operational flight control system.* A flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing, can be completed automatically. In the event of a failure, the automatic landing system will operate as a fail-passive system.
(7) *Fail-operational hybrid landing system.* A system which consists of a primary fail-passive automatic landing system and a secondary independent guidance system enabling the pilot to complete a landing manually after failure of the primary system.
(8) *Visual approach.* An approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.
(9) *Continuous descent final approach (CDFA).* A specific technique for flying the final-approach segment of a non- precision instrument approach procedure as a continuous descent, without level-off, from an altitude/height at or above the Final Approach Fix altitude/height to a point approximately 15 m (50 feet) above the landing runway threshold or the point where the flare manoeuvre should begin for the type of aeroplane flown.
(10) *Stabilised approach (SAp*). An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a pre-determined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.
(11) *Head-up display (HUD).* A display system which presents flight information into the pilot's forward external field of view and which does not significantly restrict the external view.
(12) *Head-up guidance landing system (HUDLS).* The total airborne system, which provides head-up guidance to the pilot during the approach and landing and/or go-around. It includes all sensors, computers, power supplies, indications and controls. A HUDLS is typically used for primary approach guidance to decision heights of 50 ft.
(13) *Hybrid head-up display landing system (hybrid HUDLS).* A system, which consists of a primary fail-passive automatic landing system and a secondary independent HUD/HUDLS, enabling the pilot to complete a landing manually after failure of the primary system.

Note: Typically, the secondary independent HUD/HUDLS provides guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.

(14) *Enhanced vision system (EVS).* An electronic means of displaying a real-time image of the external scene through the use of imaging sensors.
(15) *Converted meteorological visibility (CMV).* A value (equivalent to an RVR) which is derived from the reported meteorological visibility, as converted in accordance with the requirements in this subpart.
(16) *Lower than Standard Category I Operation*. A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be associated with the applicable DH.
(17) *Other than Standard Category II Operation*. A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available.
(18) *GNSS landing system (GLS).* An approach operation using augmented GNSS information to provide guidance to the aircraft based on its lateral and vertical GNSS position. (It uses geometric altitude reference for its final approach slope).

AUA-OPS 1.440 Low Visibility Operations – General Operating Rules
(See Appendix 1 to AUA-OPS 1.440)

(a) An operator shall not conduct Category II, Other than Standard Category II or Category III operations unless:
(1) Each aeroplane concerned is certificated for operations with Decision Heights below 200 ft, or no decision height, and equipped in accordance with EASA CS–AWO or an equivalent accepted by the Authority;
(2) A suitable system for recording approach and/or automatic landing success and failure is established and maintained to monitor the overall safety of the operation;
(3) The operations are approved by the Authority;
(4) The flight crew consists of at least two pilots; and
(5) Decision Height is determined by means of a radio altimeter.
(6) RVR information is provided

(b) An operator shall not conduct low visibility take-offs in less than 150 m RVR (Category A, B and C aeroplanes) or 200 m RVR (Category D aeroplanes) unless approved by the Authority.

(c) An operator shall not conduct Lower than Standard Category I operations unless approved by the Authority.

AUA-OPS 1.445 Low Visibility Operations – Aerodrome Considerations

(a) An operator shall not use an aerodrome for Category II or III operations unless the aerodrome is approved for such operations by the State in which the aerodrome is located.
(b) An operator shall verify that Low Visibility Procedures (LVP) have been established, and will be enforced, at those aerodromes where low visibility operations are to be conducted.

AUA-OPS 1.450 Low Visibility Operations – Training and Qualifications
(See Appendix 1 to AUA-OPS 1.450)

(a) An operator shall ensure that, prior to conducting low visibility take-off, Lower than Standard Category I, Other than Standard Category II, Category II and III operations or approaches utilising EVS:
(1) Each flight crew member:
(i) Completes the training and checking requirements prescribed in Appendix 1 including Flight Simulator training in operating to the limiting values of RVR/CMV and Decision Height appropriate to the operator's approval; and
(ii) Is qualified in accordance with Appendix 1.
(2) The training and checking is conducted in accordance with a detailed syllabus approved by the Authority and included in the Operations Manual. This training is in addition to that prescribed in Subpart N; and
(3) The flight crew qualification is specific to the operation and the aeroplane type.

AUA-OPS 1.455 Low Visibility Operations – Operating Procedures
(See Appendix 1 to AUA-OPS 1.455)

(a) An operator must establish procedures and instructions to be used for low visibility take-off, approaches utilising EVS, Lower than Standard Category I, Other than Standard Category II, Category II and III operations. These procedures must be included in the Operations Manual and contain the duties of flight crew members during taxiing, take-off, approach, flare, landing, roll-out and missed approach as appropriate.
(b) The commander shall satisfy himself/herself that:
(1) The status of the visual and non-visual facilities is sufficient prior to commencing a low visibility take-off, an approach utilising EVS, Lower than Standard Category I, Other than Standard Category II, or a Category II or III approach;
(2) Appropriate LVPs are in force according to information received from Air Traffic Services, before commencing a low visibility take-off, a Lower than Standard Category I, an Other than Standard Category II, or a Category II or III approach; and
(3) The flight crew members are properly qualified prior to commencing a low visibility take-off in an RVR of less than 150 m (Category A, B and C aeroplanes) or 200 m (Cat D aeroplanes), an approach utilising EVS, a Lower than Standard Category I, an Other than Standard Category II or a Category II or III approach.

AUA-OPS 1.460 Low Visibility Operations – Minimum Equipment

(a) An operator must include in the Operations Manual the minimum equipment that has to be serviceable at the commencement of a low visibility take-off, a Lower than Standard Category I approach, an Other than Standard Category II approach, an approach utilising EVS, or a Category II or III approach in accordance with the AFM or other approved document.
(b) The commander shall satisfy himself/herself that the status of the aeroplane and of the relevant airborne systems is appropriate for the specific operation to be conducted.

AUA-OPS 1.465 VFR Operating Minima
(See Appendix 1 to AUA-OPS 1.465)

(a) An operator shall ensure that:
(1) VFR flights are conducted in accordance with the Visual Flight Rules and in accordance with the Table in Appendix 1 to AUA-OPS 1.465.
(2) Special VFR flights are not commenced when the visibility is less than 3 km and not otherwise conducted when the visibility is less than 1.5 km.

Appendix 1 to AUA-OPS 1.430
Aerodrome Operating Minima
(See IEM to Appendix 1 to AUA-OPS 1.430)
(See AC to Appendix 1 to AUA-OPS 1.430)

(a) *Take-off Minima*

(1) *General*
(i) Take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and the aeroplane characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions (e.g. ceiling) must be specified.
(ii) The commander shall not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a suitable take-off alternate aerodrome is available.
(iii) When the reported meteorological visibility is below that required for take-off and RVR is not reported, a take-off may only be commenced if the commander can determine that the RVR/visibility along the take-off runway is equal to or better than the required minimum.
(iv) When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the commander can determine that the RVR/visibility along the take-off runway is equal to or better than the required minimum.
(2) *Visual reference.* The take-off minima must be selected to ensure sufficient guidance to control the aeroplane in the event of both a discontinued take-off in adverse circumstances and a continued take-off after failure of the critical power unit.
(3) *Required RVR/Visibility*
(i) For multi-engine aeroplanes, whose performance is such that, in the event of a critical power unit failure at any point during take-off, the aeroplane can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins, the take-off minima established by an operator must be expressed as RVR/Visibility values not lower than those given in Table 1 below except as provided in paragraph (4).

Table 1 - RVR/Visibility for Take-off Take-off

RVR/Visibility

Facilities	**RVR/Visibility** (Note 3)
Nil (Day only)	500 m
Runway edge lighting and/or centreline marking	250/300 m (Notes 1 & 2)
Runway edge and centreline lighting	200/250 m (Note 1)
Runway edge and centreline lighting and multiple RVR information	150/200 m (Notes 1 & 4)

Note 1: The higher values apply to Category D aeroplanes.
Note 2: For night operations at least runway edge and runway end lights are required.
Note 3: The reported RVR/Visibility value representative of the initial part of the take-off run can be replaced by pilot assessment.
Note 4: The required RVR value must be achieved for all of the relevant RVR reporting points with the exception given in Note 3 above.
(ii) For multi-engine aeroplanes whose performance is such that they cannot comply with the performance conditions in sub-paragraph (a)(3)(i) above in the event of a critical power unit failure, there may be a need to re-land immediately and to see and avoid obstacles in the take-off area. Such aeroplanes may be operated to the following take-off minima provided they are able to comply with the applicable obstacle clearance criteria, assuming engine failure at the height specified. The take-off minima established by an operator must be based upon the height from which the one-engine-inoperative net take-off flight path can be constructed. The RVR minima used may not be lower than either of the values given in Table 1 above or Table 2 below.

Table 2 - Assumed engine failure height above the runway versus RVR/Visibility

Take-off RVR/Visibility – flight path	
Assumed engine failure height above the take-off runway	**RVR/Visibility** (Note 2)
< 50 ft	200 m
51 – 100 ft	300 m
101 – 150 ft	400 m
151 – 200 ft	500 m
201 – 300 ft	1 000 m
> 300 ft	1 500 m (Note 1)

Note 1: 1 500 m is also applicable if no positive take-off flight path can be constructed.
Note 2: The reported RVR/Visibility value representative of the initial part of the take-off run can be replaced by pilot assessment.

(iii) When reported RVR, or meteorological visibility is not available, the commander shall not commence take-off unless he can determine that the actual conditions satisfy the applicable take-off minima.
(4) *Exceptions to sub-paragraph (a)(3)(i) above:*
(i) Subject to the approval of the Authority, and provided the requirements in paragraphs (A) to (E) below have been satisfied, an operator may reduce the take-off minima to 125 m RVR (Category A, B and C aeroplanes) or 150 m RVR (Category D aeroplanes) when:

(A) Low Visibility Procedures are in force;
(B) High intensity runway centreline lights spaced 15 m or less and high intensity edge lights spaced 60 m or less are in operation;
(C) Flight crew members have satisfactorily completed training in a Flight Simulator;
(D) A 90 m visual segment is available from the cockpit at the start of the take-off run; and
(E) The required RVR value has been achieved for all of the relevant RVR reporting points.

(ii) Subject to the approval of the Authority, an operator of an aeroplane using either;

(A) an approved lateral guidance system; or
(B) an approved HUD/HUDLS for take-off may reduce the take-off minima to an RVR less than 125 m (Category A, B and C aeroplanes) or 150 m (Category D aeroplanes) but not lower than 75 m provided runway protection and facilities equivalent to Category III landing operations are available.

(b) *Category 1, APV and Non-Precision approach*

(1) A Category I approach operation is a precision instrument approach and landing using ILS, MLS, GLS (GNSS/GBAS) or PAR with a decision height not lower than 200 ft and with an RVR not less than 550 m, unless accepted by the Authority.
(2) A non-precision approach (NPA) operation is an instrument approach using any of the facilities described in Table 3 (System minima), with a MDH or DH not lower than 250 ft and an RVR/CMV of not less than 750 m, unless accepted by the Authority.
(3) An APV operation is an instrument approach which utilises lateral and vertical guidance, but does not meet the requirements established for precision approach and landing operations, with a DH not lower than 250 ft and a runway visual range of not less than 600m unless approved by the Authority.
(4) Decision height (DH). An operator must ensure that the decision height to be used for an approach is not lower than:
(i) the minimum height to which the approach aid can be used without the required visual reference; or
(ii) the OCH for the category of aeroplane; or
(iii) the published approach procedure decision height where applicable; or
(iv) 200 ft for Category I approach operations; or
(v) the system minimum in Table 3; or
(vi) the lowest decision height specified in the Aeroplane Flight Manual (AFM) or equivalent document, if stated; whichever is higher.
(5) Minimum descent height (MDH). An operator must ensure that the minimum descent height for an approach is not lower than:
(i) the OCH for the category of aeroplane; or
(ii) the system minimum in Table 3; or
(iii) the minimum descent height specified in the Aeroplane Flight Manual if stated; whichever is higher.
(6) Visual reference. A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:
(i) elements of the approach light system;

(ii) the threshold;
(iii) the threshold markings;
(iv) the threshold lights;
(v) the threshold identification lights;
(vi) the visual glide slope indicator;
(vii) the touchdown zone or touchdown zone markings;
(viii) the touchdown zone lights;
(ix) runway edge lights; or
(x) other visual references accepted by the Authority.

Table 3 - System Minima v. Facilities System minima

Facility	Lowest DH (MDH)
Localizer with or without DME	250 ft
SRA (terminating at ½ NM)	250 ft
SRA (terminating at 1 NM)	300 ft
SRA (terminating at 2 NM or more)	350 ft
RNAV/LNAV	300 ft
VOR	300 ft
VOR/DME	250 ft
NDB	350 ft
NDB/DME	300 ft
VDF	350 ft

(c) Criteria for establishing RVR/Converted Met Visibility (Refer to Table 6)

(1) In order to qualify for the lowest allowable values of RVR/CMV detailed in Table 6 (applicable to each approach grouping) the instrument approach shall meet at least the following facility requirements and associated conditions:
(i) Instrument approaches with designated vertical profile up to and including 4,5° for Category A and B aeroplanes, or 3.77° for Category C and D aeroplanes, unless other approach angles are approved by the Authority, where the facilities are:
(A) ILS/MLS/GLS/PAR; or
(B) APV; and
where the final approach track is offset by not more than 15° for Category A and B aeroplanes or by not more than 5° for Category C and D aeroplanes.
(ii) Instrument approaches flown using the CDFA technique with a nominal vertical profile, up to and including 4.5° for Category A and B aeroplanes, or 3.77° for Category C and D aeroplanes, unless other approach angles are approved by the Authority where the facilities are NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA or RNAV/LNAV, with a final-approach segment of at least 3 NM, which also fulfil the following criteria:
(A) The final approach track is offset by not more than 15° for Category A and
(B) The FAF or another appropriate fix where descent is initiated is available, or distance to THR is available by FMS/RNAV or DME; and
(C) If the MAPt is determined by timing, the distance from FAF to THR is ≤ 8 NM.
(iii) Instrument approaches where the facilities are NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA or RNAV/LNAV, not fulfilling the criteria in paragraph (c)1.(ii) above, or with an MDH ≥ 1 200 ft.
(2) The missed approach, after an approach has been flown using the CDFA technique, shall be executed when reaching the decision altitude (height) or the MAPt, whichever occurs first. The lateral part of the missed approach procedure must be flown via the MAPt unless otherwise stated on the approach chart.

(d) Determination of RVR/CMV/Visibility minima for Category I, APV and non-precision approach operations

(1) The minimum RVR/CMV/Visibility shall be the highest of the values derived from Table 5 or Table 6 but not greater than the maximum values shown in Table 6 where applicable.
(2) The values in Table 5 are derived from the formula below:

Required RVR/visibility (m) = (DH/MDH (ft) × 0.3048)/tanα – length of approach lights (m)

Note 1: α is the calculation angle, being a default value of 3.00 degrees increasing in steps.

(3) With the approval of the Authority, the formula may be used with the actual approach slope and/or the actual length of the approach lights for a particular runway.
(4) If the approach is flown with a level flight segment at or above MDA/H, 200 metres shall be added for Cat A and B aeroplane and 400 metres for Cat C and D aeroplane to the minimum RVR/CMV value resulting from the application of Tables 5 and 6.
Note: The added value corresponds to the time/distance required to establish the aeroplane on the final descent.
(5) An RVR of less than 750 m as indicated in Table 5 may be used:
(i) for Category I approach operations to runways with FALS (see below), Runway Touchdown Zone Lights (RTZL) and Runway Centreline Lights (RCLL) provided that the DH is not more than 200 ft; or
(ii) for Category I approach operations to runways without RTZL and RCLL when using an approved HUDLS, or equivalent approved system, or when conducting a coupled approach or flight-director-flown approach to a DH equal to or greater than 200 ft. The ILS must not be promulgated as a restricted facility; or
(iii) for APV approach operations to runways with FALS, RTZL and RCLL when using an approved HUD.
(6) The Authority may approve RVR values lower than those given in Table 5, for HUDLS and auto-land operations in accordance with paragraph (e) of this Appendix.
(7) The visual aids comprise standard runway day markings and approach and runway lighting (runway edge lights, threshold lights, runway end lights and in some cases also touch-down zone and/or runway centre line lights). The approach light configurations acceptable are classified and listed in Table 4 below.
(8) Notwithstanding the requirements in paragraph (d)(7) above, the authority may approve that RVR values relevant to a Basic Approach Lighting System (BALS) are used on runways where the approach lights are restricted in length below 210m due to terrain or water, but where at least one cross-bar is available.
(9) For night operations or for any operation where credit for runway and approach lights is required, the lights must be on and serviceable except as provided for in Table 6a.

Table 4 - Approach light systems

OPS Class Facility	Length, configuration and intensity of approach lights
FALS (full approach light system)	ICAO: Precision approach CAT I Lighting System (HIALS 720m ≥) distance coded centerline, Barette centreline
IALS (intermediate approach light system)	ICAO: Simple approach Lighting System (HIALS 420-719 m) single source, Barette
BALS (basic approach light system)	Any other approach lighting system (HIALS,MIALS OR ALS 210-419M)
	Any other approach lighting system (HIALS,MIALS OR ALS < 210m) or no approach lights

Table 5 - RVR/CMV (See Table 11) v. DH/MDH

DH or MDH			Class of Lighting Facility			
			FALS	IALS	BALS	NALS
			See paragraphs (d)5, (d)6 and (d)10 about RVR < 750 m			
Feet			Metres			
200	—	210	550	750	1 000	1 200
211	—	220	550	800	1 000	1 200
221	—	230	550	800	1 000	1 200
231	—	240	550	800	1 000	1 200
241	—	250	550	800	1 000	1 300
251	—	260	600	800	1 100	1 300
261	—	280	600	900	1 100	1 300
281	—	300	650	900	1 200	1 400
301	—	320	700	1 000	1 200	1 400
321	—	340	800	1 100	1 300	1 500
341	—	360	900	1 200	1 400	1 600
361	—	380	1 000	1 300	1 500	1 700
381	—	400	1 100	1 400	1 600	1 800
401	—	420	1 200	1 500	1 700	1 900
421	—	440	1 300	1 600	1 800	2 000
441	—	460	1 400	1 700	1 900	2 100
461	—	480	1 500	1 800	2 000	2 200
481		500	1 500	1 800	2 100	2 300
501	—	520	1 600	1 900	2 100	2 400
521	—	540	1 700	2 000	2 200	2 400
541	—	560	1 800	2 100	2 300	2 500
561	—	580	1 900	2 200	2 400	2 600
581	—	600	2 000	2 300	2 500	2 700
601	—	620	2 100	2 400	2 600	2 800
621	—	640	2 200	2 500	2 700	2 900
641	—	660	2 300	2 600	2 800	3 000
661	—	680	2 400	2 700	2 900	3 100
681	—	700	2 500	2 800	3 000	3 200
701	—	720	2 600	2 900	3 100	3 300
721	—	740	2 700	3 000	3 200	3 400
741	—	760	2 700	3 000	3 300	3 500
761	—	800	2 900	3 200	3 400	3 600
801	—	850	3 100	3 400	3 600	3 800
851	—	900	3 300	3 600	3 800	4 000
901	—	950	3 600	3 900	4 100	4 300
951	—	1 000	3 800	4 100	4 300	4 500
1 001	—	1 100	4 100	4 400	4 600	4 900
1 101	—	1 200	4 600	4 900	5 000	5 000
1 201 and above			5 000	5 000	5 000	5 000

Table 6 - Minimum and maximum applicable RVR/converted met visibility (see Table 11) for all instrument approaches down to CAT I minima (lower and upper cut-off limits):

Facility/conditions	RVR/CMV (m)	Aeroplane category			
		A	B	C	D
ILS, MLS, GLS, PAR and APV	Min	According to Table 5			
	Max	1 500	1 500	2 400	2 400
NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, RNAV/LNAV with a procedure which fulfils the criteria in paragraph (c)1.(ii):	Min	750	750	750	750
	Max	1 500	1 500	2 400	2 400
For NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, RNAV/LNAV: — not fulfilling the criteria in paragraph (c)1.(ii) above, or — with a DH or MDH ≥ 1 200 ft	Min	1 000	1 000	1 200	1 200
	Max	According to Table 5 if flown using the CDFA technique, otherwise an add-on of 200/400 m applies to the values in Table 5 but not to result in a value exceeding 5 000 m.			

Table 6a - Failed or downgraded equipment — effect on landing minima

Failed or downgraded equipment (*Note 1*)	Effect on landing minima				
	CAT IIIB (*Note 2*)	CAT IIIA	CAT II	CAT I	Non precision
ILS stand-by transmitter	Not allowed		No effect		
Outer Marker	No effect if replaced by published equivalent position				Not applicable
Middle marker	No effect				No effect unless used as MAPT
Touchdown zone RVR assessment system	May be temporarily replaced with midpoint RVR if approved by the State of the aerodrome. RVR may be reported by human observation			No effect	
Midpoint or stopend RVR	No effect				
Anemometer for runway in use	No effect if other ground source available				
Celiometer	No effect				
Approach lights	Not allowed for operations with DH > 50 ft		Not allowed	minima as for nil facilities	
Approach lights except the last 210 m	No effect		Not allowed	minima as for nil facilities	
Approach lights except the last 420 m	No effect			minima as for intermediate facilities	

<table>
<tr><th rowspan="2">Failed or downgraded equipment
(Note 1)</th><th colspan="5">Effect on landing minima</th></tr>
<tr><th>CAT IIIB
(Note 2)</th><th>CAT IIIA</th><th>CAT II</th><th>CAT I</th><th>Non precision</th></tr>
<tr><td>Standby power for approach lights</td><td colspan="5">No effect</td></tr>
<tr><td>Whole runway light system</td><td colspan="3">Not allowed</td><td colspan="2">Day — minima as for nil facilities
Night — Not allowed</td></tr>
<tr><td>Edge lights</td><td colspan="5">Day only; Night — not allowed</td></tr>
<tr><td>Centreline lights</td><td colspan="2">Day — RVR 300m
Night — not allowed</td><td>Day — RVR 300 m
Night — 550 m</td><td colspan="2">No effect</td></tr>
<tr><td>Centreline lights spacing increased to 30 m</td><td>RVR 150m</td><td colspan="4">No effect</td></tr>
<tr><td>Touchdown zone lights</td><td>Day — RVR 200 m
Night — 300 m</td><td colspan="2">Day — RVR 300 m
Night — 550 m</td><td colspan="2">No effect</td></tr>
<tr><td>Standby power for runway lights</td><td colspan="3">Not allowed</td><td colspan="2">No effect</td></tr>
<tr><td>Taxiway light system</td><td colspan="5">No effect — except delays due to reduced movement rate</td></tr>
</table>

Note 1: Conditions applicable to Table 6a:
- (a) multiple failures of runway lights other than indicated in Table 6a are not acceptable.
- (b) deficiencies of approach and runway lights are treated separately.
- (c) Category II or III operations. A combination of deficiencies in runway lights and RVR assessment equipment is not allowed.
- (d) failures other than ILS affect RVR only and not DH.

Note 2: For CAT IIIB operations with no DH, an operator shall ensure that, for aeroplanes authorised to conduct no DH operations with the lowest RVR limitations, the following applies in addition to the content of Table 6a:
- (a) RVR. At least one RVR value must be available at the aerodrome;
- (b) runway lights
  - (i) no runway edge lights, or no centre lights — Day — RVR 200 m; night — not allowed;
  - (ii) no TDZ lights — no restrictions;
  - (iii) no standby power to runway lights — Day — RVR 200 m; night — not allowed.

(10) Single-pilot operations. For single-pilot operations, an operator must calculate the minimum RVR/visibility for all approaches in accordance with OPS 1.430 and this Appendix.
(i) An RVR of less than 800 metres as indicated in Table 5 may be used for Category I approaches provided any of the following is used at least down to the applicable DH:
(A) a suitable autopilot, coupled to an ILS or MLS which is not promulgated as restricted; or
(B) an approved HUDLS (including, where appropriate, EVS), or equivalent approved system.
(ii) Where RTZL and/or RCLL are not available, the minimum RVR/CMV shall not be less than 600 m.
(iii) An RVR of less than 800 metres as indicated in Table 5 may be used for APV operations to runways with FALS, RTZL and RCLL when using an approved HUDLS, or equivalent approved system, or when conducting a coupled approach to a DH equal to or greater than 250 ft.

(e) *Lower than Standard Category I Operations*

(1) Decision height.
A Lower than Standard Category I Operation decision height must not be lower than:
(i) the minimum decision height specified in the AFM, if stated; or
(ii) the minimum height to which the precision approach aid can be used without the required visual reference; or
(iii) the OCH for the category of aeroplane; or
(iv) the decision height to which the flight crew is authorised to operate; or
(v) 200 ft.
whichever is higher.
(2) Type of facility.
An ILS/MLS which supports a Lower than Standard Category I operation must be an unrestricted facility with a straight-in course (≤ 3° offset) and the ILS must be certificated to:
(i) Class I/T/1 for operations to a minimum of 450m RVR; or
(ii) Class II/D/2 for operations to less than 450m RVR.
Single ILS facilities are only acceptable if Level 2 performance is provided.

(3) Required RVR/CMV.
The lowest minima to be used by an operator for Lower than Standard Category I operations are stipulated in Table 6b below:

Table 6b - Lower than Standard Category I Minimum RVR/CMV v. approach light system

Lower than Standard Category I minima						
DH (ft)			Class of lighting facility			
			FALS	IALS	BALS	NALS
			RVR/CMV (metres)			
200	—	210	400	500	600	750
211	—	220	450	550	650	800
221	—	230	500	600	700	900
231	—	240	500	650	750	1 000
241	—	249	550	700	800	1 100

Note 1: The visual aids comprise standard runway day markings, approach lighting, runway edge lights, threshold lights, runway end lights and, for operations below 450m, shall include touch-down zone and/or runway centre line lights.

(4) Visual reference. A pilot shall not continue an approach below decision height unless visual reference containing a segment of at least three consecutive lights being the centre line of the approach lights, or touchdown zone lights, or runway centre line lights, or runway edge lights, or a combination of these is attained and can be maintained. This visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS usable to at least 150 ft.
(5) Approval.
To conduct Lower than Standard Category I operations:
(i) the approach shall be flown auto-coupled to an auto-land; or an approved HUDLS shall be used to at least 150 ft above the threshold.
(ii) the aeroplane shall be certificated in accordance with EASA CS-AWO to conduct Category II operations;
(iii) the auto-land system shall be approved for Category IIIA operations;
(iv) in-service proving requirements shall be completed in accordance with Appendix 1 to AUA-OPS 1.440 paragraph (h);
(v) training specified in Appendix 1 to AUA-OPS 1.450 paragraph (h) shall be completed, this shall include training and checking in a Flight Simulator using the appropriate ground and visual aids at the lowest applicable RVR;
(vi) the Operator must ensure that Low Visibility procedures are established and in operation at the intended aerodrome of landing; and
(vii) the Operator shall be approved by the Authority.

(f) Precision approach — Category II and Other than Standard Category II operations

(1) General.
(i) A Category II operation is a precision instrument approach and landing using ILS or MLS with:
(A) a decision height below 200 ft but not lower than 100 ft; and
(B) a runway visual range of not less than 300 m.
(ii) An Other than Standard Category II operation is a precision instrument approach and landing using ILS or MLS which meets facility requirements as established in paragraph (iii) below with:
(A) a decision height below 200 ft but not lower than 100 ft; (See Table 7b below) and
(B) a runway visual range of not less than 350/400 m. (See Table 7b below)
(iii) The ILS/MLS that supports other than a Standard Category II operation shall be an unrestricted facility with a straight in course (≤ 3° offset) and the ILS shall be certificated to:
(A) Class I/T/1 for operations down to 450m RVR and to a DH of 200 ft or more; or,
(B) Class II/D/2 for operations in RVRs of less than 450m or to a DH of less than 200 ft.
Single ILS facilities are only acceptable if Level 2 performance is provided.
(2) Decision Height. An operator must ensure that the decision height for:
(i) Other than Standard Category II and Category II operations is not lower than:
(A) the minimum decision height specified in the AFM, if stated; or

(B) the minimum height to which the precision approach aid can be used without the required visual reference; or
(C) the OCH for the category of aeroplane; or
(D) the decision height to which the flight crew is authorised to operate; or
(E) 100 ft;
whichever is higher.

(3) Visual reference. A pilot may not continue an approach below either the Category II or the Other than Standard Category II decision height determined in accordance with subparagraph (f)(2) above unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or runway centre line lights, or runway edge lights, or a combination of these is attained and can be maintained.
This visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS to touchdown.

(4) (i) Required RVR. The lowest minima to be used by an operator for Category II operations are (see over):

Table 7a - RVR for Cat II operations v. DH

Category II minima		
DH(ft)	Auto-coupled/Approved HUDLS to below DH (Note 1a)	
	RVR Aeroplane Category A, B and C	RVR Aeroplane Category D
100-120	300 m	300/350m (Note 2a)
121-140	400 m	400 m
141 and above	450 m	450m

Note 1a: The reference to "auto-coupled to below DH/Approved HUDLS" in this table means continued use of the automatic flight control system or the HUDLS down to a height of 80 % of the DH. Thus airworthiness requirements may, through minimum engagement height for the automatic flight control system, affect the DH to be applied.
Note 2a: 300 m may be used for a Category D aeroplane conducting an auto-land.

(ii) Required RVR. The lowest minima to be used by an operator for Other than Standard Category II operations are:

Table 7b - Other than Standard Category II Minimum RVR v. approach light system

Other than Standard Category II minima					
	Auto-land or approved HUDLS utilised to touchdown				
	Class of lighting facility				
	FALS		IALS	BALS	NALS
	See para (d)5., (d)6. and (d)10. about RVR < 750m				
	CAT A-C	CAT D	CAT A-D	CAT A-D	CAT A-D
DH (ft)	RVR metres				
100-120	350	400	450	600	700
121-140	400	450	500	600	700
141-160	450	500	500	600	750
161-199	450	500	550	650	750

Note The visual aids required to conduct other than Standard Category II Operations comprise standard runway day markings and approach and runway lighting (runway edge lights, threshold lights, runway end lights). For operations in RVR of 400 m or less, centre line lights must be available. The approach light configurations are classified and listed in Table 4 above.

(iii) To conduct Other than Standard Category II operations the operator must ensure that appropriate low visibility procedures are established and in operation at the intended aerodrome of landing.

(g) Precision approach — Category III operations

(1) General. Category III operations are subdivided as follows:
(i) Category III A operations. A precision instrument approach and landing using ILS or MLS with:
(A) a decision height lower than 100 ft; and
(B) a runway visual range not less than 200 m.
(ii) Category III B operations. A precision instrument approach and landing using ILS or MLS with:
(A) a decision height lower than 100 ft, or no decision height; and
(B) a runway visual range lower than 200 m but not less than 75 m.
Note: Where the decision height (DH) and runway visual range (RVR) do not fall within the same Category, the RVR will determine in which Category the operation is to be considered.
(2) Decision Height. For operations in which a decision height is used, an operator must ensure that the decision height is not lower than:
(i) the minimum decision height specified in the AFM, if stated; or
(ii) the minimum height to which the precision approach aid can be used without the required visual reference; or
(iii) the decision height to which the flight crew is authorised to operate.
(3) No decision height operations. Operations with no decision height may only be conducted if:
(i) the operation with no decision height is authorised in the AFM; and
(ii) the approach aid and the aerodrome facilities can support operations with no decision height; and
(iii) the operator has an approval for CAT III operations with no decision height.
Note: In the case of a CAT III runway it may be assumed that operations with no decision height can be supported unless specifically restricted as published in the AIP or NOTAM.
(4) Visual reference.
(i) For Category IIIA operations, and for Category IIIB operations conducted either with fail-passive flight control systems, or with the use of an approved HUDLS, a pilot may not continue an approach below the decision height determined in accordance with subparagraph (g)(2) above unless a visual reference containing a segment of at least three consecutive lights being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of these is attained and can be maintained.
(ii) For Category IIIB operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system (comprising e.g. a HUDLS) using a decision height a pilot may not continue an approach below the decision height, determined in accordance with subparagraph (e)(2) above, unless a visual reference containing at least one centreline light is attained and can be maintained.
(5) Required RVR. The lowest minima to be used by an operator for Category III operations are:

Table 8 - RVR for Cat III Operations v. DH and roll-out control/guidance system

Category III minima			
Category	Decision height (ft) *(Note 2)*	Roll-out control/Guidance system	RVR (m)
IIIA	Less than 100 ft	Not required	200 m
IIIB	Less than 100 ft	Fail-passive	150 m *(Note 1)*
IIIB	Less than 50 ft	Fail-passive	125 m
IIIB	Less than 50 ft or No decision height	Fail-operational *(Note 3)*	75 m

Note 1: For aeroplanes certificated in accordance with EASA CS-AWO 321(b)3 or equivalent.
Note 2: Flight control system redundancy is determined under EASA CS-AWO by the minimum certificated decision height.
Note 3: The fail-operational system referred to may consist of a fail-operational hybrid system.

(h) Enhanced vision systems

(1) A pilot using an enhanced vision system certificated for the purpose of this paragraph and used in accordance with the procedures and limitations of the approved flight manual, may;
(i) continue an approach below DH or MDH to 100 feet above the threshold elevation of the runway provided that at least one of the following visual references is displayed and identifiable on the enhanced vision system:
(A) elements of the approach lighting; or
(B) the runway threshold, identified by at least one of the following: the beginning of the runway landing surface, the threshold lights, the threshold identification lights; and the touchdown zone, iden-

tified by at least one of the following: the runway touchdown zone landing surface, the touchdown zone lights, the touchdown zone markings or the runway lights;

(ii) reduce the calculated RVR/CMV for the approach from the value in column 1 of Table 9 below to the value in column 2:

Table 9

Approach utilising EVS RVR/CMV reduction v. normal RVR/CMV

RVR/CMV normally required	RVR/CMV for approach utilising EVS
550	350
600	400
650	450
700	450
750	500
800	550
900	600
1 000	650
1 100	750
1 200	800
1 300	900
1 400	900
1 500	1 000
1 600	1 100
1 700	1 100
1 800	1 200
1 900	1 300
2 000	1 300
2 100	1 400
2 200	1 500
2 300	1 500
2 400	1 600
2 500	1 700
2 600	1 700
2 700	1 800
2 800	1 900
2 900	1 900
3 000	2 000
3 100	2 000
3 200	2 100
3 300	2 200
3 400	2 200
3 500	2 300
3 600	2 400
3 700	2 400
3 800	2 500
3 900	2 600
4 000	2 600
4 100	2 700
4 200	2 800
4 300	2 800
4 400	2 900
4 500	3 000
4 600	3 000
4 700	3 100
4 800	3 200
4 900	3 200
5 000	3 300

(2) Paragraph (h)(1) above may only be used for ILS, MLS, PAR, GLS and APV Operations with a DH no lower than 200 feet or an approach flown using approved vertical flight path guidance to a MDH or DH no lower than 250 feet.

(3) A pilot may not continue an approach below 100 feet above runway threshold elevation for the intended runway, unless at least one of the visual references specified below is distinctly visible and identifiable to the pilot without reliance on the enhanced vision system:

(A) The lights or markings of the threshold; or

(B) The lights or markings of the touchdown zone.

(i) *Intentionally left blank*

(j) Circling

(1) Minimum descent height (MDH). The MDH for circling shall be the higher of;
(i) the published circling OCH for the aeroplane category; or
(ii) the minimum circling height derived from Table 10 below; or
(iii) the DH/MDH of the preceding instrument approach procedure.
(2) Minimum descent altitude (MDA). The MDA for circling shall be calculated by adding the published aerodrome elevation to the MDH, as determined by (1) above.
(3) Visibility. The minimum visibility for circling shall be the higher of;
(i) the circling visibility for the aeroplane category, if published; or
(ii) the minimum visibility derived from Table 10 below; or
(iii) the RVR/CMV derived from Tables 5 and 6 for the preceding instrument approach procedure.
(4) Notwithstanding the requirements in subparagraph (3) above, the Authority may exempt an operator from the requirement to increase the visibility above that derived from Table 10.
(5) Exemptions as described in subparagraph (4) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator’s experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals.

Table 10 - Minimum visibility and MDH for circling v. aeroplane category

	Aeroplane Category			
	A	B	C	D
MDH (ft)	400	500	600	700
Minimum meteorological visibility (m)	1 500	1 600	2 400	3 600

(6) Circling with prescribed tracks is an accepted procedure within the meaning of this paragraph

(k) Visual approach.

An operator shall not use an RVR of less than 800 m for a visual approach.

(l) Conversion of reported meteorological visibility to RVR/CMV.

(1) An operator must ensure that a meteorological visibility to RVR/CMV conversion is not used for takeoff, for calculating any other required RVR minimum less than 800 m, or when reported RVR is available.
Note: If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. “RVR more than 1 500 metres”, it is not considered to be a reported value for the purpose of this paragraph.
(2) When converting meteorological visibility to RVR in all other circumstances than those in subparagraph (l)(1) above, an operator must ensure that the following Table is used:

Table 11 - Conversion of met visibility to RVR/CMV

Lighting elements in operation	RVR/CMV = Reported met. Visibility ×	
	Day	Night
HI approach and runway lighting	1,5	2,0
Any type of lighting installation other than above	1,0	1,5
No lighting	1,0	Not applicable

Appendix 2 to OPS 1.430(c)
Aeroplane Categories – All Weather Operations

(a) *Classification of aeroplanes*
The criteria taken into consideration for the classification of aeroplanes by categories is the indicated airspeed at threshold (VAT) which is equal to the stalling speed (VSO) multiplied by 1·3 or VS1G multiplied by 1·23 in the landing configuration at the maximum certificated landing mass. If both VSO and VS1G are available, the higher resulting VAT shall be used. The aeroplane categories corresponding to VAT values are in the Table below:

Aeroplane Category	VAT
A	Less than 91 kt
B	From 91 to 120 kt
C	From 121 to 140 kt
D	From 141 to 165 kt
E	From 166 to 210 kt

The landing configuration which is to be taken into consideration shall be defined by the operator or by the aeroplane manufacturer.

(b) *Permanent change of category (maximum landing mass)*

(1) An operator may impose a permanent, lower, landing mass, and use this mass for determining the VAT if approved by the Authority.
(2) The category defined for a given aeroplane shall be a permanent value and thus independent of the changing conditions of day-to-day operations.

Appendix 1 to OPS 1.440
Low Visibility Operations – General Operating Rules

(a) *General.* The following procedures apply to the introduction and approval of low visibility operations.

(b) *Operational Demonstration.* The purpose of the operational demonstration is to determine or validate the use and effectiveness of the applicable aircraft flight guidance systems, including HUDLS if appropriate, training, flight crew procedures, maintenance programme, and manuals applicable to the Category II/III programme being approved.

(1) At least 30 approaches and landings must be accomplished in operations using the Category II/III systems installed in each aircraft type if the requested DH is 50 ft or higher. If the DH is less than 50 ft, at least 100 approaches and landings will need to be accomplished unless otherwise approved by the Authority.

(2) If an operator has different variants of the same type of aircraft utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aircraft, the operator must show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant. The Authority may also accept a reduction of the number of approach and landings based on credit given for the experience gained by another operator with an AOC issued in accordance with OPS 1 using the same aeroplane type or variant and procedures.

(3) If the number of unsuccessful approaches exceeds 5% of the total (e.g. unsatisfactory landings, system disconnects) the evaluation programme must be extended in steps of at least 10 approaches and landings until the overall failure rate does not exceed 5 %.

(c) *Data Collection For Operational Demonstrations*. Each applicant must develop a data collection method (e.g. a form to be used by the flight crew) to record approach and landing performance. The resulting data and a summary of the demonstration data shall be made available to the Authority for evaluation.

(d) *Data Analysis*. Unsatisfactory approaches and/or automatic landings shall be documented and analysed.

(e) *Continuous Monitoring*

(1) After obtaining the initial authorisation, the operations must be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.

(2) The following information must be retained for a period of 12 months:

(i) The total number of approaches, by aeroplane type, where the airborne Category II or III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable Category II or III minima; and

(ii) Reports of unsatisfactory approaches and/or automatic landings, by aerodrome and aeroplane registration, in the following categories:

(A) Airborne equipment faults;
(B) Ground facility difficulties;
(C) Missed approaches because of ATC instructions; or
(D) Other reasons.

(3) An operator must establish a procedure to monitor the performance of the automatic landing system or HUDLS to touchdown performance, as appropriate, of each aeroplane.

(f) *Transitional periods*

(1) *Operators with no previous Category II or III experience*

(i) An operator without previous Category II or III operational experience may be approved for Category II or IIIA operations, having gained a minimum experience of 6 months of Category I operations on the aeroplane type.

(ii) On completing 6 months of Category II or IIIA operations on the aeroplane type the operator may be approved for Category IIIB operations. When granting such an approval, the Authority may impose higher minima than the lowest applicable for an additional period. The increase in minima will normally only refer to RVR and/or a restriction against operations with no decision height and must be selected such that they will not require any change of the operational procedures.

(2) (i) *Operators with previous Category II or III experience.* An operator with previous Category II or III experience may obtain authorisation for a reduced transition period by application to the Authority.

(ii) An operator authorised for Category II or III operations using auto-coupled approach procedures, with or without auto-land, and subsequently introducing manually flown Category II or III operations using a HUDLS shall be considered to be a “New Category II/III operator” for the purposes of the demonstration period provisions.

(g) *Maintenance of Category II, Category III and LVTO equipment.* Maintenance instructions for the on-board guidance systems must be established by the operator, in liaison with the manufacturer, and included in the operator’s aeroplane maintenance programme, which must be approved by the Authority.

(h) Eligible Aerodromes and Runways

(1) Each aeroplane type/runway combination must be verified by the successful completion of at least one approach and landing in Category II or better conditions, prior to commencing Category III operations.

(2) For runways with irregular pre-threshold terrain or other foreseeable or known deficiencies, each aeroplane type/runway combination must be verified by operations in Category I or better conditions, prior to commencing Lower than Standard Category I, Category II, or Other than Standard Category II or III operations.

(3) If an operator has different variants of the same type of aeroplane in accordance with sub-paragraph (4) below, utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aeroplane in accordance with sub-paragraph (4) below, the operator must show that the variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant/runway combination.

(4) For the purpose of paragraph (h), an aeroplane type or variant of an aeroplane type is deemed to be the same type/variant of aeroplane if that type/variant has the same or similar:
- (i) level of technology, including the:
  - (A) FGS and associated displays and controls;
  - (B) the FMS and level of integration with the FGS;
  - (C) use of HUDLS.
- (ii) Operational procedures, including:
  - (A) alert height;
  - (B) manual landing/automatic landing;
  - (C) no decision height operations;
  - (D) use of HUD/HUDLS in hybrid operations.
- (iii) Handling characteristics, including:
  - (A) manual landing from automatic or HUDLS guided approach;
  - (B) manual go-around from automatic approach;
  - (C) automatic/manual roll out.

(5) Operators using the same aeroplane type/class or variant of a type in accordance with subparagraph (4) above may take credit from each others' experience and records in complying with this paragraph.

(6) Operators conducting Other than Standard Category II operations shall comply with Appendix 1 to OPS 1.440 — Low Visibility Operations — General Operating Rules applicable to Category II operations.

Appendix 1 to OPS 1.450
Low Visibility Operations – Training & Qualifications

(a) *General.* An operator must ensure that flight crew member training programmes for Low Visibility Operations include structured courses of ground, Flight Simulator and/or flight training. The operator may abbreviate the course content as prescribed by sub-paragraphs (2) and (3) below provided the content of the abbreviated course is acceptable to the Authority.
  (1) Flight crew members with no Category II or Category III experience must complete the full training programme prescribed in sub-paragraphs (b), (c) and (d) below.
  (2) Flight crew members with Category II or Category III experience with a similar type of operation (auto-coupled/auto-land, HUDLS/Hybrid HUDLS or EVS) or Category II with manual land if appropriate with another Community operator may undertake an:
    (i) abbreviated ground training course if operating a different type/class from that on which the previous Category II or Category III experience was gained;
    (ii) abbreviated ground, flight simulator and/or flight training course if operating the same type/class and variant of the same type or class on which the previous Category II or Category III experience was gained. The abbreviated course is to include at least the requirements of subparagraphs (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i). With the approval of the Authority, the operator may reduce the number of approaches/landings required by subparagraph (d)(2)(i) if the type/class or the variant of the type or class has the same or similar;
    (A) level of technology — flight control/guidance system (FGS); and
    (B) operational procedures;
    (C) handling characteristics (See paragraph (4) below) as the previously operated type or class, other wise the requirement of (d)(2)(i) has to be met in full;
    (D) use of HUDLS/hybrid HUDLS;
    (E) use of EVS.
  (3) Flight crew members with Category II or Category III experience with the operator may undertake an abbreviated ground, Flight simulator and/or flight training course. The abbreviated course when changing:
    (i) aeroplane type/class is to include at least the requirements of subparagraphs (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i);
    (ii) to a different variant of aeroplane within the same type or class rating that has the same or similar:
      (A) level of technology — flight control/guidance system (FGS); and
      (B) operational procedures — integrity;
      (C) handling characteristics (See paragraph (4) below);
      (D) use of HUDLS/Hybrid HUDLS;
      (E) use of EVS
    as the previously operated type or class, then a difference course or familiarization appropriate to the change of variant fulfils the abbreviated course requirements;
    (iii) to a different variant of aeroplane within the same type or class rating that has a significantly difEferrent;
      (A) level of technology — flight control/guidance system (FGS); and
      (B) operational procedures — integrity;
      (C) handling characteristics (See paragraph (4) below);
      (D) use of HUDLS/Hybrid HUDLS;
      (E) use of EVS
    then the requirements of subparagraphs (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i) shall be fulfilled. With the approval of the Authority the operator may reduce the number of approaches/landings required by subparagraph (d)(2)(i).
  (4) An operator must ensure when undertaking Category II or Category III operations with different variant(s) of aeroplane within the same type or class rating that the differences and/or similarities of the aeroplanes concerned justify such operations, taking account at least the following:
    (i) the level of technology, including the;
      (A) FGS and associated displays and controls;
      (B) Flight Management System and its integration or not with the FGS;
      (C) use of HUD/HUDLS with hybrid systems and/or EVS;
    (ii) operational procedures, including;
      (A) fail-passive/fail-operational, alert height;
      (B) manual landing/automatic landing;
      (C) no decision height operations;
      (D) use of HUD/HUDLS with hybrid systems;
    (iii) handling characteristics, including;
      (A) manual landing from automatic HUDLS and/or EVS guided approach;
      (B) manual go-around from automatic approach;
      (C) automatic/manual roll out.

(b) *Ground Training.* An operator must ensure that the initial ground training course for Low Visibility Operations covers at least:
- (1) The characteristics and limitations of the ILS and/or MLS;
- (2) The characteristics of the visual aids;
- (3) The characteristics of fog;
- (4) The operational capabilities and limitations of the particular airborne system to include symbology and EVS characteristics if appropriate;
- (5) The effects of precipitation, ice accretion, low level wind shear and turbulence;
- (6) The effect of specific aeroplane malfunctions;
- (7) The use and limitations of RVR assessment systems;
- (8) The principles of obstacle clearance requirements;
- (9) Recognition of and action to be taken in the event of failure of ground equipment;
- (10) The procedures and precautions to be followed with regard to surface movement during operations when the RVR is 400 m or less and any additional procedures required for take-off in conditions below 150 m (200 m for Category D aeroplanes);
- (11) The significance of decision heights based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems;
- (12) The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height;
- (13) The qualification requirements for pilots to obtain and retain approval to conduct Low Visibility Take-offs and Category II or III operations; and
- (14) The importance of correct seating and eye position.

(c) *Flight Simulator training and/or flight training*
- (1) An operator must ensure that Flight Simulator and/or flight training for Low Visibility Operations includes:
  - (i) Checks of satisfactory functioning of equipment, both on the ground and in flight;
  - (ii) Effect on minima caused by changes in the status of ground installations;
  - (iii) Monitoring of;
    - (A) automatic flight control systems and autoland status annunciators with emphasis on the action to be taken in the event of failures of such systems; and
    - (B) HUD/HUDLS/EVS guidance status and annunciators as appropriate, to include head down displays.
  - (iv) Actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems;
  - (v) The effect of known unserviceabilities and use of minimum equipment lists;
  - (vi) Operating limitations resulting from airworthiness certification;
  - (vii) Guidance on the visual cues required at decision height together with information on maximum deviation allowed from glidepath or Localizer; and
  - (viii) The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height.
- (2) An operator must ensure that each flight crew member is trained to carry out his/her duties and instructed on the coordination required with other crew members. Maximum use should be made of Flight Simulators.
- (3) Training must be divided into phases covering normal operation with no aeroplane or equipment failures but including all weather conditions which may be encountered and detailed scenarios of aeroplane and equipment failure which could affect Category II or III operations. If the aeroplane system involves the use of hybrid or other special systems (such as HUD/HUDLS or enhanced vision equipment) then flight crew members must practise the use of these systems in normal and abnormal modes during the Flight Simulator phase of training.
- (4) Incapacitation procedures appropriate to Low Visibility Take-offs and Category II and III operations shall be practised.
- (5) For aeroplanes with no Flight Simulator available to represent that specific aeroplane operators must ensure that the flight training phase specific to the visual scenarios of Category II operations is conducted in a specifically approved Flight Simulator. Such training must include a minimum of four approaches. The training and procedures that are type-specific shall be practised in the aeroplane.
- (6) Initial Category II and III training shall include at least the following exercises:
  - (i) Approach using the appropriate flight guidance, autopilots and control systems installed in the aeroplane, to the appropriate decision height and to include transition to visual flight and landing;
  - (ii) Approach with all engines operating using the appropriate flight guidance systems, autopilots, HUDLS and/or EVS and control systems installed in the aeroplane down to the appropriate decision height followed by missed approach; all without external visual reference;
  - (iii) Where appropriate, approaches utilising automatic flight systems to provide automatic flare, landing and roll-out; and
  - (iv) Normal operation of the applicable system both with and without acquisition of visual cues at decision height.

(7) Subsequent phases of training must include at least:
   (i) approaches with engine failure at various stages on the approach;
   (ii) approaches with critical equipment failures (e.g. electrical systems, autoflight systems, ground and/or airborne ILS/MLS systems and status monitors);
   (iii) approaches where failures of autoflight equipment and/or HUD/HUDLS/EVS at low level require either;
      (A) reversion to manual flight to control flare, landing and roll out or missed approach; or
      (B) reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below decision height including those which may result in a touchdown on the runway;
   (iv) Failures of the systems which will result in excessive Localizer and/or glideslope deviation, both above and below decision height, in the minimum visual conditions authorised for the operation. In addition, a continuation to a manual landing must be practised if a head-up display forms a downgraded mode of the automatic system or the head-up display forms the only flare mode; and
   (v) Failures and procedures specific to aeroplane type or variant.
(8) The training programme must provide practice in handling faults which require a reversion to higher minima.
(9) The training programme must include the handling of the aeroplane when, during a fail-passive Category III approach, the fault causes the autopilot to disconnect at or below decision height when the last reported RVR is 300 m or less.
(10) Where take-offs are conducted in RVRs of 400 m and below, training must be established to cover systems failures and engine failure resulting in continued as well as rejected take-offs.
(11) The training programme must include, where appropriate, approaches where failures of the HUDLS and/or EVS equipment at low level require either:
   (i) reversion to head down displays to control missed approach; or
   (ii) reversion to flight with no, or downgraded, HUDLS Guidance to control missed approaches from decision height or below, including those which may result in a touchdown on the runway.
(12) An operator shall ensure that when undertaking low visibility take-off, Lower than Standard Category I, Other than Standard Category II, and Category II and III Operations utilising a HUD/HUDLS or hybrid HUD/HUDLS or an EVS, that the training and checking programme includes, where appropriate, the use of the HUD/HUDLS in normal operations during all phases of flight.

(d) *Conversion Training Requirements to conduct Low Visibility Take-off, Lower than Standard category I, Other than Standard Category II, approach utilising EVS and Category II and III Operations.* An operator shall ensure that each flight crew member completes the following Low Visibility Procedures training if converting to a new type/class or variant of aeroplane in which Low Visibility Take-off, Lower than Standard Category I, Other than Standard category II, Approach utilising EVS with an RVR of 800 m or less and Category II and III Operations will be conducted. The flight crew member experience requirements to undertake an abbreviated course are prescribed in sub-paragraphs (a)(2), (a)(3) and (a)(4), above:
(1) *Ground Training.* The appropriate requirements prescribed in sub-paragraph (b) above, taking into account the flight crew member's Category II and Category III training and experience.
(2) *Flight Simulator Training and/or Flight training.*
   (i) A minimum of six (eight for HUDLS with or without EVS) approaches and/or landings in a Flight Simulator. The requirement for eight HUDLS approaches may be reduced to six when conducting Hybrid HUDLS operations. (See sub-paragraph 4.(i) below)
   (ii) Where no Flight Simulator is available to represent that specific aeroplane, a minimum of three (five for HUDLS and/or EVS) approaches including at least one go-around is required on the aeroplane. For Hybrid HUDLS operations a minimum of three approaches is required, including at least one go-around.
   (iii) Appropriate additional training if any special equipment is required such as head-up displays or enhanced vision equipment. When approach operations utilising EVS are conducted with an RVR of less than 800 m, a minimum of five approaches, including at least one go-around is required on the aeroplane.
(3) *Flight Crew Qualification.* The flight crew qualification requirements are specific to the operator and the type of aeroplane operated.
   (i) The operator must ensure that each flight crew member completes a check before conducting Category II or III operations.
   (ii) The check prescribed in sub-paragraph (i) above may be replaced by successful completion of the Flight Simulator and/or flight training prescribed in sub-paragraph (d)2 above.
(4) *Line Flying under Supervision (LIFUS).* An operator must ensure that each flight crew member undergoes the following line flying under supervision:
   (i) For Category II when a manual landing or a HUDLS approach to touchdown is required, a minimum of
      (A) three landings from autopilot disconnect;
      (B) four landings with HUDLS used to touchdown;

except that only one manual landing (two using HUDLS to touchdown) is required when the training required in subparagraph (d)(2) above has been carried out in a flight simulator qualified for zero flight time conversion.

(ii) For Category III, a minimum of two autolands except that

(A) only one autoland is required when the training required in sub-paragraph (d)(2)above has been carried out in a Flight Simulator qualified for zero flight time conversion.

(B) no autoland is required during LIFUS when the training required in sub-paragraph (d)(2) above has been carried out in a flight simulator qualified for zero flight time (ZFT) conversion and the flight crew member successfully completed the ZFT type rating conversion course;

(C) the flight crew member, trained and qualified in accordance with paragraph (B) above, is qualified to operate during the conduct of LIFUS to the lowest approved DA(H) and RVR as stipulated in the Operations Manual.

(iii) For Category III approaches using HUDLS to touchdown a minimum of four approaches.

(e) Type and command experience.

(1) Before commencing Category II operations, the following additional requirements are applicable to commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aeroplane type/class:

(i) 50 hours or 20 sectors on the type, including line flying under supervision; and

(ii) 100 m must be added to the applicable Category II RVR minima when the operation requires a Category II manual landing or use of HUDLS to touchdown until:

(A) a total of 100 hours or 40 sectors, including LIFUS has been achieved on the type; or

(B) a total of 50 hours or 20 sectors, including LIFUS has been achieved on the type where the flight crew member has been previously qualified for Category II manual landing operations with an operator;

(C) for HUDLS operations the sector requirements in paragraphs (e) (1) and (e) (2) (i) shall always be applicable, the hours on type/class does not fulfil the requirement.

(2) Before commencing Category III operations, the following additional requirements are applicable to commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aeroplane type:

(i) 50 hours or 20 sectors on the type, including line flying under supervision; and

(ii) 100 m must be added to the applicable Category II or Category III RVR minima unless he has previously qualified for Category II or III operations with an operator, until a total of 100 hours or 40 sectors, including line flying under supervision, has been achieved on the type.

(3) The Authority may authorise a reduction in the above command experience requirements for flight crew members who have Category II or Category III command experience.

(f) *Low Visibility Take-Off with RVR less than 150/200 m*

(1) An operator must ensure that prior to authorisation to conduct take-offs in RVRs below 150 m (below 200 m for Category D aeroplanes) the following training is carried out:

(i) Normal take-off in minimum authorised RVR conditions;

(ii) Take-off in minimum authorised RVR conditions with an engine failure between V1 and V2, or as soon as safety considerations permit; and

(iii) Take-off in minimum authorised RVR conditions with an engine failure before V1 resulting in a rejected take-off.

(2) An operator must ensure that the training required by sub-paragraph (1) above is carried out in a Flight Simulator. This training must include the use of any special procedures and equipment. Where no Flight Simulator is available to represent that specific aeroplane, the Authority may approve such training in an aeroplane without the requirement for minimum RVR conditions. (See Appendix 1 to OPS 1.965)

(3) An operator must ensure that a flight crew member has completed a check before conducting low visibility take-offs in RVRs of less than 150 m (less than 200 m for Category D aeroplanes) if applicable. The check may only be replaced by successful completion of the Flight Simulator and/or flight training prescribed in sub-paragraph (f)(1) on conversion to an aeroplane type.

(g) *Recurrent Training and Checking – Low Visibility Operations*

(1) An operator must ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation for which he/she is authorised is checked. The required number of approaches within the validity period of the operator proficiency check (as prescribed in OPS 1.965(b)) is to be a minimum of two, (four when HUDLS and/or EVS is utilised to touchdown) one of which must be a landing at the lowest approved RVR; in addition one (two for HUDLS and/or operations utilising EVS) of these approaches may be substituted by an approach and landing in the aeroplane using approved Category II or III procedures. One missed approach shall be flown during the conduct of the operator's proficiency check. If the operator is authorised to conduct take-off with RVR less than 150/200 m, at least one LVTO to the lowest applicable minima shall be flown during the conduct of the operators proficiency check. (See IEM OPS 1.450(g)(1)).

(2) For Category III operations an operator must use a Flight Simulator.

(3) An operator must ensure that, for Category III operations on aeroplanes with a fail-passive flight control system, including HUDLS, a missed approach is completed at least once over the period of three consecutive operator proficiency checks as the result of an autopilot failure at or below decision height when the last reported RVR was 300 m or less.
(4) The Authority may authorise recurrent training and checking for Category II and LVTO operations in an aeroplane type where no Flight Simulator to represent that specific aeroplane or an acceptable alternate is available.
Note: Recency for LVTO and Category II/III based upon automatic approaches and/or autolands is maintained by the recurrent training and checking as prescribed in this paragraph.

(h) Additional training requirements for operators conducting Lower than Standard Category I, approaches utilising EVS and Other than Standard Category II Operations.
(1) Operators conducting Lower than Standard Category I operations shall comply with the requirements of Appendix 1 to AUAOPS 1.450 - low visibility operations - training and qualifications applicable to Category II operations to include the requirements applicable to HUDLS (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be additional to the requirements of OPS 1, Subpart N provided the training is conducted utilising the lowest applicable RVR. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach using Lower than Standard Category I minima is conducted at least once every 18 months.
(2) Operators conducting Other than Standard Category II operations shall comply with the requirements of Appendix 1 to AUA-OPS 1.450 - low visibility operations - training and qualifications applicable to Category II operations to include the requirements applicable to HUDLS (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be less than that required to complete Category II training utilising a HUD/HUDLS. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach using Other than Standard Category II minima is conducted at least once every 18 months.
(3) Operators conducting approach operations utilising EVS with RVR of 800 m or less shall comply with the requirements of Appendix 1 to AUA-OPS 1.450 - Low Visibility Operations - Training and Qualifications applicable to Category II operations to include the requirements applicable to HUD (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be less than that required to complete Category II training utilising a HUD. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach utilising EVS is conducted at least once every 12 months.

Appendix 1 to OPS 1.455
Low Visibility Operations – Operating procedures

(a) *General.* Low Visibility Operations include:
(1) Manual take-off (with or without electronic guidance systems or HUDLS/Hybrid HUD/HUDLS);
(2) Auto-coupled approach to below DH, with manual flare, landing and roll-out;
(3) Approach flown with the use of HUDLS/Hybrid HUD/HUDLS and/or EVS;
(4) Auto-coupled approach followed by auto-flare, autolanding and manual roll-out;
(5) Auto-coupled approach followed by auto-flare, auto landing and auto roll-out, when the applicable RVR is less than 400m.
Note 1: A hybrid system may be used with any of these modes of operations.
Note 2: Other forms of guidance systems or displays may be certificated and approved.

(b) *Procedures and Operating Instructions*
(1) The precise nature and scope of procedures and instructions given depend upon the airborne equipment used and the flight deck procedures followed. An operator must clearly define flight crew member duties during take-off, approach, flare, roll-out and missed approach in the Operations Manual. Particular emphasis must be placed on flight crew responsibilities during transition from non-visual conditions to visual conditions, and on the procedures to be used in deteriorating visibility or when failures occur. Special attention must be paid to the distribution of flight deck duties so as to ensure that the workload of the pilot making the decision to land or execute a missed approach enables him/her to devote himself/herself to supervision and the decision making process.
(2) An operator must specify the detailed operating procedures and instructions in the Operations Manual. The instructions must be compatible with the limitations and mandatory procedures contained in the Aeroplane Flight Manual and cover the following items in particular:
(i) Checks for the satisfactory functioning of the aeroplane equipment, both before departure and in flight;
(ii) Effect on minima caused by changes in the status of the ground installations and airborne equipment;
(iii) Procedures for the take-off, approach, flare, landing, roll-out and missed approach;
(iv) Procedures to be followed in the event of failures, warnings to include HUD/HUDLS/EVS and other non-normal situations;
(v) The minimum visual reference required;
(vi) The importance of correct seating and eye position;
(vii) Action which may be necessary arising from a deterioration of the visual reference;
(viii) Allocation of crew duties in the carrying out of the procedures according to sub-paragraphs (i) to (iv) and (vi) above, to allow the commander to devote himself/herself mainly to supervision and decision making;
(ix) The requirement for all height calls below 200 ft to be based on the radio altimeter and for one pilot to continue to monitor the aeroplane instruments until the landing is completed;
(x) The requirement for the Localizer Sensitive Area to be protected;
(xi) The use of information relating to wind velocity, windshear, turbulence, runway contamination and use of multiple RVR assessments;
(xii) procedures to be used for:
(A) Lower than Standard Category I;
(B) Other than Standard Category II;
(C) approaches utilising EVS; and
(D) practice approaches and landing on runways at which the full Category II or Category III aerodrome procedures are not in force;
(xiii) Operating limitations resulting from airworthiness certification; and
(xiv) Information on the maximum deviation allowed from the ILS glide path and/or Localizer.

Appendix 1 to AUA-OPS 1.465
Minimum Visibilities for VFR Operations

Airspace class		A B C D E (Note 1)	F G	
			Above 900 m (3000 ft) AMSL or above 300 m (1000 ft) above ter- rain, whichever is the higher	At and below 900 m (3000 ft) AMSL or 300 m (1000 ft) above terrain, whichever is the higher
Distance from cloud		1 500 m horizontally 300 m (1 000 ft) vertically		Clear of cloud and in sight of the surface
Flight visibility	8 km at and above 3 050 m (10 000 ft) AMSL (Note 1) 5 km below 3 050 m (10 000 ft) AMSL			5 km (Note 3)

Note 1: VMC Minima for Class A airspace are included for guidance but do not imply acceptance of VFR flights in Class A airspace.
Note 2: When the height of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000ft.
Note 3: Cat A and B aeroplanes may be operated in flight visibilities down to 3 000 m, provided the appropriate ATS authority permits use of a flight visibility less than 5 km, and the circumstances are such, that the probability of encounters with other traffic is low, and the IAS is 140 kt or less.

AUA-OPS 1.475 subpart (f)

(f) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the applicable noise certification Standards in ICAO Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a certain aerodrome or a runway wherethere is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

AUA-OPS 1.620 subpart (f)

(f) Mass values for baggage

(1) Where the total number of passengers seats available on the aeroplane is 20 or more the standard mass values given in Table 3 are applicable for each piece of checked baggage. For aeroplanes with 19 passenger seats or less, the actual mass of checked baggage, determined by weighing, must be used.

(2) For the purpose of Table 3:

(i) Domestic flights means flights with origin and destination within the borders of Aruba, Curacao or Bonaire;

(ii) Flights within the Caribbean Region means flights, other than Domestic flights, whose origin and destination are within the area specified in Aruba Appendix 1 to JAR-OPS 1.620(f); and

(iii) Intercontinental flights, other than flights within the Caribbean region, means flights with origin and destination in different continents.

Appendix 1 to AUA-OPS 1.620(f)

Definition of the area for flights within the Caribbean region

For the purpose of JAR-OPS 1.620(f), flights within the Caribbean region, other than domestic flights, are flights conducted within the area, bounded by rhumb-lines between the following points

N3000 W07500
N3000 W08500
N0800 W08500
N0400 W06000
N0400 W05900
N0200 W05900

as depicted in Figure I below:



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AUA-OPS 1.650 sub (q) and (r)

(q) VFR flights which are operated as controlled flights shall be equipped in accordance with JAR-OPS 1.652.
(r) Pressurized aeroplanes newly introduced into service on or after 1 July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the pilot of any dangerous loss of pressurization.

AUA-OPS 1.655 Additional equipment for single pilot operation under IFR

An operator shall not conduct single pilot IFR operations unless approved by the Authority and unless the aeroplane is equipped with an autopilot with at least altitude hold and heading mode.

AUA-OPS 1.665(f)

(f) A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances:
(1) excessive descent rate;
(2) excessive terrain closure rate;
(3) excessive altitude loss after take-off or go-around;
(4) unsafe terrain clearance while not in landing configuration:
(a) gear not locked down;
(b) flaps not in a landing position; and
(5) excessive descent below the instrument glide path.

AUA-OPS 1.668 Airborne Collision Avoidance System
(See IEM OPS 1.668)

(a) All turbine-engine aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorised to carry more than 19 passengers shall be equipped with an airborne collision avoidance system with a minimum performance level of at least ACAS II.
(b) An airborne collision avoidance system shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV.

AUA-OPS 1.700

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AUA-OPS 1.701 Flight recorders (general)

(a) Crash protected flight recorders comprise four systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.
(b) Lightweight flight recorders comprise four systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.
(c) Detailed guidance on flight recorders is contained in Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721.

AUA-OPS 1.705

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AUA-OPS 1.706 Flight data recorders and aircraft data recording systems

(a) Parameters to be recorded are listed in Tables A8-1 and A8-3 of Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721.

(b) Types
(1) Types I and IA FDR shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation.
(2) Types II and IIA FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

(c) Operation
Airborne image recorders (AIRs) classification is defined in section 4.1 of Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721.
(1) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less for which the application for type certification is submitted to the State of Design on or after 1 January 2016 shall be equipped with:
a) a Type II FDR; or
b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or
c) an ADRS capable of recording the essential parameters defined in Table A8-3 of Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721.
(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type I FDR.
(3) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, shall be equipped with a Type II FDR.
(4) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5 700 kg, except those in AUA-OPS 1.706(c)(5), shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.
(5) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a Type II FDR.
(6) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before1 January 1987, with a maximum certificated take-off mass of over 5 700 kg shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.
(7) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with a Type IA FDR.
(8) All aeroplanes which are required to record normal acceleration, lateral acceleration and longitudinal acceleration for which the application for type certification is submitted to the State of Design on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.0625 seconds.
(9) All aeroplanes which are required to record pilot input and/or control surface position of primary controls (pitch, roll, yaw) for which the application for type certification is submitted to the State of Design on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.125 seconds.

(d) Discontinuation
1. The use of engraving metal foil FDRs shall be discontinued.
2. The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.
3. The use of photographic film FDRs shall be discontinued.
4. The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

(e) Duration
All FDRs shall be capable of retaining the information recorded during at least the last 25 hours of their operation, except for the Type IIA FDR which shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

AUA-OPS 1.710

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AUA-OPS 1.711 Cockpit voice recorders and cockpit audio recording systems

(a) Operation
1. All turbine-engined aeroplanes of a maximum certificated take-off mass of over 2250 kg, up to and including 5700 kg for which the application for type certification is submitted to the State of Design on or after 1

January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

2. All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2003, shall be equipped with a CVR capable of retaining the information recorded during at least the last two hours of its operation.

3. All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

4. All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before1 January 1987, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

(b) *Discontinuation*

The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

(c) *Duration*

(1) All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

(2) From 1 January 2016, all CVRs shall be capable of retaining the information recorded during at least the last two hours of their operation.

(d) *Cockpit Voice Recorder alternate power*

(1) An alternate power source shall automatically engage and provide ten minutes, plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power. The alternate power source shall power the CVR and its associated cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source.

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the application for type certification is submitted to the State of Design on or after 1 January 2018 shall be provided with an alternate power source, as defined in AUA-OPS 1.711(d)(1), that powers the forward CVR in the case of combination recorders.

AUA-OPS 1.715

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AUA-OPS 1.716 Data link recorders

(a) Applicability

(1) All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016,which utilize any of the data link communications applications listed in 5.1.2 of Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721 and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

(2) All aeroplanes which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721 and are required to carry a CVR shall record on a flight recorder the data link communications messages.

(b) Duration

The minimum recording duration shall be equal to the duration of the CVR.

(c) Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

AUA-OPS 1.720

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AUA-OPS 1.721 Flight recorders — general

(a) Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

(b) Operation

(1) Flight recorders shall not be switched off during flight time.

(2) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with ICAO Annex 13.

(c) Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

(d) Procedures for the inspections of the flight recorder systems are given in Appendix of AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721.

AUA-OPS 1.725

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AUA-OPS 1.727 Combination recorders

All aeroplanes of a maximum certificated take-off mass of over 15 000 kg for which the application for type certification is submitted to the State of Design on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

APPENDIX to AUA-OPS 1.701, 1.706, 1.711, 1.716 and 1.721

The material in this Appendix concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Crashed protected flight recorders comprise four systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and a data link recorder (DLR). Lightweight flight recorders comprise four systems, an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and a data link recording system (DLRS).

1. General requirements

1.1 The flight recorder systems containers shall:
a) be painted a distinctive orange or yellow colour;
b) carry reflective material to facilitate their location; and
c) have securely attached an automatically activated underwater locating device.

1.2 The flight recorder systems shall be installed so that:
a) the probability of damage to the recordings is minimized;
b) they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads;
c) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and
d) if the flight recorder systems have a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.

1.3 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.4 Means shall be provided for an accurate time correlation between the flight recorder systems recordings.

1.5 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recording systems:
a) manufacturer's operating instructions, equipment limitations and installation procedures;
b) parameter origin or source and equations which relate counts to units of measurement; and
c) manufacturer's test reports.

2. Flight Data Recorder (FDR)

2.1 The flight data recorder shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

2.2 Parameters to be recorded
2.2.1 Flight data recorders shall be classified as Type I, Type IA, Type II and Type IIA depending upon the number of parameters to be recorded and the duration required for retention of the recorded information.
2.2.2 The parameters that satisfy the requirements for FDRs are listed in the paragraphs below. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.
2.2.2.1 The following parameters shall satisfy the requirements for flight path and speed:
— Pressure altitude
— Indicated airspeed or calibrated airspeed
— Air-ground status and each landing gear air-ground sensor when practicable
— Total or outside air temperature
— Heading (primary flight crew reference)
— Normal acceleration
— Lateral acceleration
— Longitudinal acceleration (body axis)
— Time or relative time count
— Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
— Groundspeed*
— Radio altitude*

2.2.2.2 The following parameters shall satisfy the requirements for attitude:
— Pitch attitude
— Roll attitude
— Yaw or sideslip angle*
— Angle of attack*
2.2.2.3 The following parameters shall satisfy the requirements for engine power:
— Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
— Thrust reverse status*
— Engine thrust command*
— Engine thrust target*
— Engine bleed valve position*
— Additional engine parameters*: EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3
2.2.2.4 The following parameters shall satisfy the requirements for configuration:
— Pitch trim surface position
— Flaps*: trailing edge flap position, cockpit control selection
— Slats*: leading edge flap (slat) position, cockpit control selection
— Landing gear*: landing gear, gear selector position
— Yaw trim surface position*
— Roll trim surface position*
— Cockpit trim control input position pitch*
— Cockpit trim control input position roll*
— Cockpit trim control input position yaw*
— Ground spoiler and speed brake*: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection
— De-icing and/or anti-icing systems selection*
— Hydraulic pressure (each system)*
— Fuel quantity in CG trim tank *
— AC electrical bus status*
— DC electrical bus status*
— APU bleed valve position*
— Computed centre of gravity*
2.2.2.5 The following parameters shall satisfy the requirements for operation:
— Warnings
— Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis
— Marker beacon passage
— Each navigation receiver frequency selection
— Manual radio transmission keying and CVR/FDR synchronization reference
— Autopilot/autothrottle/AFCS mode and engagement status*
— Selected barometric setting*: pilot, first officer
— Selected altitude (all pilot selectable modes of operation)*
— Selected speed (all pilot selectable modes of operation)*
— Selected Mach (all pilot selectable modes of operation)*
— Selected vertical speed (all pilot selectable modes of operation)*
— Selected heading (all pilot selectable modes of operation)*
— Selected flight path (all pilot selectable modes of operation)*: course/DSTRK, path angle
— Selected decision height*
— EFIS display format*: pilot, first officer
— Multi-function/engine/alerts display format*
— GPWS/TAWS/GCAS status*: selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warnings, and advisories, on/off switch position
— Low pressure warning*: hydraulic pressure, pneumatic pressure
— Computer failure*
— Loss of cabin pressure*
— TCAS/ACAS (traffic alert and collision avoidance system/airborne collision avoidance system)*
— Ice detection*
— Engine warning each engine vibration*
— Engine warning each engine over temperature*
— Engine warning each engine oil pressure low*
— Engine warning each engine over speed*
— Wind shear warning*
— Operational stall protection, stick shaker and pusher activation*
— All cockpit flight control input forces*: control wheel, control column, rudder pedal cockpit input forces

— Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path
— Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path
— DME 1 and 2 distances*
— Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS
— Brakes*: left and right brake pressure, left and right brake pedal position
— Date*
— Event marker*
— Head up display in use*
— Para visual display on*

2.2.2.6 *Type IA FDR*. This FDR shall be capable of recording, as appropriate to the aeroplane, at least the 78 parameters in Table A8-1.
2.2.2.7 *Type I FDR.* This FDR shall be capable of recording, as appropriate to the aeroplane, at least the first 32 parameters in Table A8-1.
2.2.2.8 *Types II and IIA FDRs.* These FDRs shall be capable of recording, as appropriate to the aeroplane, at least the first16 parameters in Table A8-1.
2.2.2.9 The parameters that satisfy the requirements for flight path and speed as displayed to the pilot(s) are listed below.
The parameters without an (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an
(*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:
— Pressure altitude
— Indicated airspeed or calibrated airspeed
— Heading (primary flight crew reference)
— Pitch attitude
— Roll attitude
— Engine thrust/power
— Landing-gear status*
— Total or outside air temperature*
— Time*
— Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
— Radio altitude*

2.3 Additional information

2.3.1 A Type IIA FDR, in addition to a 30-minute recording duration, shall retain sufficient information from the preceding take-off for calibration purposes.
2.3.2 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.
2.3.3 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

3.1 Signals to be recorded
The CVR and CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR and CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.
3.1.1 The CVR shall record on four separate channels, or more, at least the following:
a) voice communication transmitted from or received in the aeroplane by radio;
b) aural environment on the flight deck;
c) voice communication of flight crew members on the flight deck using the aeroplane’s interphone system, if installed;
d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
e) voice communication of flight crew members using the passenger address system, if installed
3.1.2 The CARS shall record on two separate channels, or more, at least the following:
a) voice communication transmitted from or received in the aeroplane by radio;
b) aural environment on the flight deck; and
c) voice communication of flight crew members on the flight deck using the aeroplane’s interphone system, if installed.

3.1.3 The CVR shall be capable of recording on at least four channels simultaneously. On a tape-based CVR, to ensure accurate time correlation between channels, the CVR is to record in an in-line format. If a bi-directional configuration is used, the in-line format and channel allocation shall be retained in both directions.
3.1.4 The preferred channel allocation shall be as follows:
Channel 1 — co-pilot headphones and live boom microphone
Channel 2 — pilot headphones and live boom microphone
Channel 3 — area microphone
Channel 4 — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.

4. Airborne image recorder (AIR)

4.1 Classes
4.1.1 A Class A AIR captures the general cockpit area in order to provide data supplemental to conventional flight recorders.
4.1.2 A Class B AIR captures data link message displays.
4.1.3 A Class C AIR captures instruments and control panels.

4.2 Operation
The AIR must start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR must start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

5. Data link recorder (DLR)

5.1 Applications to be recorded
5.1.1 Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.
5.1.2 Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.
— Data link initiation capability
— Controller–pilot data link communications
— Data link – flight information services
— Automatic dependent surveillance – contract
— Automatic dependent surveillance – broadcast*
— Aeronautical operational control*.
Descriptions of the applications are contained in Table A8-2.

6. Aircraft data recording systems (ADRS)

6.1 Parameters to be recorded
ADRS shall be capable of recording, as appropriate to the aeroplane, at least the essential (E) parameters in Table A8-3.

6.2 Additional information
6.2.1 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.
6.2.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

7. Inspections of flight recorder systems

7.1 Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

7.2 Annual inspections shall be carried out as follows:
a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
b) the analysis of the FDR shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the aeroplane and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;
c) a complete flight from the FDR shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
d) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
e) an annual examination of the recorded signal on the CVR shall be carried out by replay of the CVR recording. While installed in the aircraft, the CVR shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
f) where practicable, during the annual examination, a sample of in-flight recordings of the CVR shall be examined for evidence that the intelligibility of the signal is acceptable; and
g) an annual examination of the recorded images on the AIR shall be carried out by replay of the AIR recording. While installed in the aircraft, the AIR shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

7.3 Flight recorder systems shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

7.4 A report of the annual inspection shall be made available on request to regulatory authorities for monitoring purposes.

7.5 Calibration of the FDR system:
a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

Table A8-1-A. Parameter Guidance for Crash Protected Flight Data Recorders (Type I, IA & II FDR)

Serial number	**Parameter**	**Measurement Range**	**Maximum sampling and recording interval**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution**
1	Time (UTC when available, otherwise relative time count or GPS time sync)	24 hours	4	±0.125% per hour	1 second
2	Pressure-altitude	–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed	95 km/h (50 kt) to max V_{So} *(Note 1)* V_{So} to 1.2 V_D *(Note 2)*	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)	360°	1	±2°	0.5°

5	Normal acceleration (*Note 3*)	–3 g to +6 g	0.125	±1% of maxi-mum range exclud-ing datum error of ±5%	0.004 g
6	Pitch attitude	±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude	±180°	0.25	±2°	0.5°
8	Radio transmission keying	On-off (one dis-crete)	1		
9	Power on each engine *(Note 4)*	Full range	1 (per engine)	±2%	0.2% of full range or the reso-lution required to operate the air-craft
10	Trailing edge flap and cockpit control selection	Full range or each discrete position	2	±5% or as pi-lot's indicator	0.5% of full range or the reso-lution required to operate the air-craft
11	Leading edge flap and cockpit control selection	Full range or each discrete position	2	±5% or as pi-lot's Indicator	0.5% of full range or the reso-lution required to operate the air-craft
12	Thrust reverser position	Stowed, in tran-sit, and reverse	1 (per engine)		
13	Ground spoiler/speed brake selection (selection and position)	Full range or each discrete position	1	±2% unless higher accura-cy uniquely required	0.2% of full range
14	Outside air temperature	Sensor range	2	±2°C	0.3°C
15	Autopilot/auto throt-tle/AFCS mode and en-gagement status	A suitable combination of discrete	1		
16	Longitudinal acceleration *(Note 3)*	±1 g	0.25	±0.015 g exclu-ding a datum error of ±0.05 g	0.004 g

Table A8-1-B. Parameter Guidance for Crash Protected Flight Data Recorders (Type I & IA FDR)

Serial number	**Parameter**	**Measurement Range**	**Max. sam-pling and recording interval**	**Accuracy lim-its (sensor input com-pared to FDR read-out)**	**Recording reso-lution**
17	Lateral acceleration (*Note 3*)	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g

18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *(Note 5) (Note 6)*	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio	altitude –6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GPS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)	Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GPS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)	Signal range	1	±3%	0.3% of full range
23	Marker beacon passage	Discrete	1		
24	Master warning	Discrete	1		
25	Each NAV receiver frequency selection *(Note 7)*	Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *(Notes 7 and 8)*	0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status	Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)	Discrete	1		
29*	Angle of attack	Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)	Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 9)*	As installed	1	As installed	
32*	Landing gear and gear selector position	Discrete	4	As installed	

Table A8-1-C. Parameter Guidance for Crash Protected Flight Data Recorders (Type IA FDR)					
Serial number	**Parameter**	**Measurement Range**	**Max. sampling and recording interval**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution**
33*	Groundspeed	As installed	1	Data should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)	(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N1, indicated vibration level, N2, EGT, fuel flow, fuel cut-off lever position, N3)	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)	Discretes	1	As installed	
37*	Windshear warning	Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)	As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))		1	As installed	
45*	Selected Decision Height	As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)	Discrete(s)	4	As installed	
47*	Multi-function/engine/alerts display format	Discrete(s)	4	As installed	
48*	AC electrical bus status	Discrete(s)	4	As installed	
49*	DC electrical bus status	Discrete(s)	4	As installed	
50*	Engine bleed valve position	Discrete(s)	4	As installed	
51*	APU bleed valve position	Discrete(s)	4	As installed	
52*	Computer failure	Discrete(s)	4	As installed	

53*	Engine thrust command	As installed	2	As installed	
54*	Engine thrust target	As installed	4	As installed	2% of full range
55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head up display in use	As installed	4	As installed	
58*	Para visual display on/off	As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed	
61*	Ice detection	As installed	4	As installed	
62*	Engine warning each engine vibration	As installed	1	As installed	
63*	Engine warning each engine over temperature	As installed	1	As installed	
64*	Engine warning each engine oil pressure low	As installed	1	As installed	
65*	Engine warning each engine over speed	As installed	1	As installed	
66*	Yaw Trim Surface Position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll Trim Surface Position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection	Discrete(s)	4		
70*	Hydraulic pressure (each system)	Full range	2	±5%	100 psi
71*	Loss of cabin pressure	Discrete	1		
72*	Cockpit trim control input position, Pitch	Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll	Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw	Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker	Discrete	1		
77*	Date	365 days	64		
78*	ANP or EPE or EPU	As installed	4	As installed	

Notes.—
1. VSo stalling speed or minimum steady flight speed in the landing configuration is in Section Abbreviations and Symbols”.

2. VD design diving speed.
3. Refer to AUA-OPS 1.706(c)(7) for increased recording requirements.
4. Record sufficient inputs to determine power.
5. For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, ''or'' applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, ''and'' applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.
6. Refer to AUA-OPS 1.706(c)(8) for increased recording requirements.
7. If signal available in digital form.
8. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
9. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:

1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;

3) warnings and alerts;

4) the identity of displayed pages for emergency procedures and checklists; and

b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

Table A8-2. Description of Applications for Data Link Recorders

Item No.	Application type	Application description	Recording content
1	Data link Initiation	This includes any applications used to logon to or initiate data link service. In FANS-1/A and ATN, these are ATS Facilities Notification (AFN) and Context Management (CM) respectively.	C
2	Controller/Pilot Communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed Surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the Automatic Dependent Surveillance (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight Information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, D-METAR, D-ATIS, D-NOTAM and other textual data link services.	C
5	Aircraft Broadcast Surveillance	This includes Elementary and Enhanced Surveillance Systems, as well as ADS-B output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M *
6	Aeronautical Operational Control Data	This includes any application transmitting or receiving data used for AOC purposes (per the ICAO definition of AOC).	M *

Key:
C: Complete contents recorded.
M: Information that enables correlation to any associated records stored separately from the aeroplane.
*: Applications to be recorded only as far as is practicable given the architecture of the system.

Table A8-3. Parameter Guidance for Aircraft Data recording Systems							
No.	Parameter name	Para meter cate-gory	Minimum recording range	Maxi-mum recor-ding interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading (Magnetic or True)	R*	±180 degrees	1	±2 degrees	0.5 degree	* If not available, record rates
2	Pitch attitude	E*	±90 degrees	0.25	±2 degrees	0.5 degree	* If not available, record rates
3	Roll attitude	E*	±180 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
4	Yaw rate	E*	±300 degrees/s	0. 25	±1% + drift of 360°/hr	2 degree/s	* Essential if no heading available
5	Pitch rate	E*	±300 degrees/s	0.25	±1% + drift of 360°/hr	2 degree/s	* Essential if no pitch attitude available
6	Roll rate	E*	±300 degrees/s	0.25	±1% + drift of 360°/hr	2 degree/s	* Essential if no roll attitude availa-ble
7	Positioning system: latitude/longitude	E	Latitude:±90 degrees Longi-tude:±180 de-grees	2 (1 if availa-ble)	As installed (0.00015 de-gree recommended)	0.00005 degree	
8	Positioning system estimated error	E*	Available range	2 (1 if availa-ble)	As installed	As in-stalled	* If available
9	Positioning system : altitude	E	–300 m (–1 000 ft) to maximum cer-tificated altitude of aeroplane +1 500 m (5 000 ft)	2 (1 if availa-ble)	As installed (±15 m (±50 ft) re-commended)	1.5 m (5 ft)	
10	Positioning system : time*	E	24 hours	1	±0.5 second	0.1 second	* UTC time preferred where available.
11	Positioning system : ground speed	E	0–1 000 kt	2 (1 if availa-ble)	As installed (±5 kt recom-mended)	1 kt	
12	Positioning system : channel	E	0–360 degrees	2 (1 if availa-ble)	As installed (± 2 degrees recommended)	0.5 de-grees	

13	Normal acceleration	E	–3 g to + 6 g (*)	0.25 (0.125 if availa-ble)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
14	Longitudinal acceleration	E	±1 g (*)	0.25 (0.125 if availa-ble)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
15	Lateral acceleration	E	±1 g (*)	0.25 (0.125 if availa-ble)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
16	External static pres-sure (or pressure alti-tude)	R	34.4 mb(3.44 in-Hg) to 310.2 b(31.02 in-Hg) or available sen-sor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) re-commended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
17	Outside air temperature (or total air temperature)	R	–50° to +90°C or available sensor range	2	As installed (±2°C re-commended)	1°C	
18	Indicated air speed	R	As the in-stalled pilot display mea-suring system or available sensor range	1	As installed (±3 % recom-mended)	1 kt (0.5 kt re-com-mended)	
19	Engine RPM	R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
20	Engine oil pressure	R	Full range	Each engine each second	As installed (5% of full range re-commended)	2% of full range	
21	Engine oil tempera-ture	R	Full range	Each engine each second	As installed (5% of full range re-commended)	2% of full range	
22	Fuel flow or pres-sure	R	Full range	Each engine each second	As installed	2% of full range	
23	Manifold pressure	R	Full range	Each engine each second	As installed	0.2% of full range	

24	Engine thrust/power/torque parameters required to determine propul-sive thrust/power*	R	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
25	Engine gas genera-tor speed (Ng)	R	0-150%	Each engine each second	As installed	0.2% of full range	
26	Free power turbine speed (Nf)	R	0-150%	Each engine each second	As installed	0.2% of full range	
27	Coolant temperature	R	Full range	1	As installed (±5°C re-commended)	1 degree Celsius	
28	Main voltage	R	Full range	Each engine each second	As installed	1 Volt	
29	Cylinder head temperature	R	Full range	Each cylinder each second	As installed	2% of full range	
30	Flaps position	R	Full range or each discrete position	2	As installed	0.5 degree	
31	31 Primary flight control surface posi-tion	R	Full range	0.25	As installed	0.2 % of full range	
32	Fuel quantity	R	Full range	4	As installed	1% of full range	
33	Exhaust gas temperature	R	Full range	Each engine each second	As installed	2% of full range	
34	Emergency voltage	R	Full range	Each engine each second	As installed	1 Volt	
35	Trim surface posi-tion	R	Full range or each discrete position	1	As installed	0.3% of full range	
36	Landing gear posi-tion	R	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and locked and down-and-locked position
37	Novel/unique air-craft features	R	As required	As re-quired	As required	As re-quired	

Key:
E: Essential parameters

R: Recommended parameters

AUA-OPS 1.730(a)(4)

(4) Except as provided in sub-paragraph (b) below, a safety belt with shoulder harness for each flight crew seat and for any seat alongside a pilot's seat incorporating a device which will automatically restrain the occupant's torso in the event of rapid deceleration;
Note 1: The safety harness for each pilot seat should incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls.
Note 2: Safety harness includes shoulder straps and a seat belt which may be used independently.

AUA-OPS 1.772 Safeguarding of Cabin Crew and Passengers during a Loss of Pressurisation

(a) Cabin crew shall be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurisation and, in addition, they should have such means of protection as will enable them to administer first aid to passengers during stabilized flight following the emergency.
(b) Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurisation.
Note: It is not envisaged that cabin crew will always be able to provide assistance to passengers during emergency descent procedures which may be required in the event of loss of pressurisation.

AUA-OPS 1.790 (g)

(g) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2016 shall:
(1) meet the applicable minimum performance requirements of the State of Registry; and
(2) not be of a type listed in Annex A, Group II of the *Montreal Protocol on Substances That Deplete the Ozone Layer*, 8th Edition, 2009.

AUA-OPS 1.825 Life Jackets
(See IEM OPS 1.825)

(a) *Land aeroplanes*. An operator shall not operate a land aeroplane:
(1) When flying over water and at a distance of more than 50 nautical miles from the shore, in the case of landplanes operated in accordance with JAR-OPS 1.500, 1.505, 1.540, 1.580 or 1.585; or
(2) When flying enroute over water beyond gliding distance from shore, in the case of all other landplanes; or
(3) When taking off or landing at an aerodrome where the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching, unless it is equipped with life jackets equipped with a survivor locator light, for each person on board. Each life jacket must be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided. Life jackets for infants may be substituted by other approved flotation devices equipped with a survivor locator light.

AUA-OPS 1.830 Life - rafts and survival ELTs for extended overwater flights

(a) On overwater flights, an operator shall not operate an aeroplane at a distance away from land, which is suitable for making an emergency landing, greater than that corresponding to:
(1) 120 minutes at cruising speed or 400 nautical miles, whichever is the lesser, for aeroplanes capable of continuing the flight to an aerodrome with the critical power unit(s) becoming inoperative at any point along the route or planned diversions; or
(2) 30 minutes at cruising speed or 100 nautical miles, whichever is the lesser, for all other aeroplanes, unless the equipment specified in sub-paragraphs (b), (c) and (d) below is carried.
(b) Sufficient life-rafts to carry all persons on board. Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity beyond the rated capacity of the rafts must accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity. The life-rafts shall be equipped with:
(1) A survivor locator light; and
(2) Life saving equipment including means of sustaining life as appropriate to the flight to be undertaken (see AMC OPS 1.830(b)(2));

(c) At least two survival Emergency Locator Transmitters (ELT(S)) capable of transmitting on the distress frequencies prescribed in ICAO Annex 10, Volume V, Chapter 2. (See ACJ OPS 1.820); and.

(d) At the earliest practicable date but not later than 1 January 2018, on all aeroplanes of a maximum certificated take-off mass of over 27 000 kg, a securely attached underwater locating device operating at a frequency of 8.8 kHz. This automatically activated underwater locating device shall operate for a minimum of 30 days and shall not be installed in wings or empennage.

AUA-OPS 1.842 Aeroplanes equipped with head-up displays (HUD) and/or enhanced vision systems (EVS)

Prior approval from the Authority is required for the operation of aircraft using head-up displays (HUD) and/or enhanced vision systems (EVS).

AUA-OPS 1.845(c)

(c) (1) An operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the Authority has approved the operator’s procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them. The operator shall continue to monitor both process and products.

(2) An operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aircraft that require it.

AUA-OPS 1.850(d)

(d) For flights in defined portions of airspace or on routes where a Required Communications Performance (RCP) type has been prescribed, an aeroplane shall, in addition to the requirements specified in this Subpart:

(1) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP type(s); and

(2) be authorized by the Authority for operations in such airspace.

AUA-OPS 1.865 (d)(2)

(2) For operations where a navigation specification for performance-based navigation has been prescribed, an aeroplane shall, in addition to requirements specified in this Subpart;

(i) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and

(ii) be authorised by the Authority for such operations.

AUA-OPS 1.866 (b) and (c)

(b) All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

(c) After 1 January 2012, all aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

AUA-OPS 1.872 (b)

(b) The aeroplane shall demonstrate a vertical navigation performance in accordance with Appendix to AUA-OPS 1.872.

(c) The operator shall institute:

(1) appropriate procedures in respect of continued airworthiness (maintenance and repair)practices and programmes; and

(2) appropriate flight crew procedures for operations in RVSM airspace.

(d) The operator shall ensure that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If an operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

APPENDIX to AUA-OPS 1.872

1. In respect of groups of aeroplanes that are nominally of identical design and build with respect to all details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of aeroplanes shall have a mean no greater than 25 m (80 ft) in magnitude and shall have a standard deviation no greater than 28 – 0.013z2 for $0 \le z \le 25$ when z is the magnitude of the mean TVE in metres, or 92 – 0.004z2 for $0 \le z \le 80$ where z is in feet. In addition, the components of TVE shall have the following characteristics:
a) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80 ft) in magnitude;
b) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft);and
c) the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.
2. In respect of aeroplanes for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of aeroplanes encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the aeroplane have the following characteristics:
a) the ASE of the aeroplane shall not exceed 60 m (200 ft) in magnitude under all flight conditions; and
b) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

AUA-OPS 1.875 General (See IEM OPS 1.875)

(a) An operator shall not operate an aeroplane unless it is maintained and released to service by:
(1) An organization appropriately approved by the Authority in accordance with AUA-RLW, or
(2) An organization accepted by the Authority and approved/accepted in accordance with EASA Part-145, except that pre-flight inspections need not necessarily be carried out by such organization.

(b) This Subpart prescribes aeroplane maintenance requirements needed to comply with the operator certification requirements in JAR-OPS 1.180.

AUA-OPS 1.880 Terminology

The following definitions from EASA Part 145 shall apply to this subpart:

(a) *Preflight inspection* – means the inspection carried out before flight to ensure that the aeroplane is fit for the intended flight. It does not include defect rectification.

(b) Approved standard – means a manufacturing /design/maintenance/quality standard approved by the Authority.

(c) *Approved by the Authority* – means approved by the authority directly or in accordance with a procedure approved by the Authority.

AUA-OPS 1.885 Application for and approval of the operator’s maintenance system

The following definitions from EASA Part 145 shall apply to this subpart:

(a) For the approval of the maintenance system, an applicant for the initial issue, variation and renewal of an AOC shall submit the documents specified in JAR-OPS 1.185(b). (See IEM OPS 1.885(a).)

(b) An applicant for the initial issue, variation and renewal of an AOC who meets the requirements of this subpart, in conjunction with the exposition of an appropriate maintenance organization as referred to in AUA-OPS 1.875(a) is entitled of approval of the maintenance system by the Authority. (See IEM OPS 1.885(b).)

Note: Detailed requirements are given in JAR-OPS 1.180(a)(3)and 1.180(b), and JAR-OPS 1.185.

AUA-OPS 1.890 Maintenance Responsibility

(a) An operator shall ensure the airworthiness of an aeroplane and serviceability of both operational and emergency equipment by (See AMC OPS 1.890(a)):
(1) The accomplishment of preflight inspections (See AMC OPS 1.890(a)(1));
(2) The rectification to an approved standard of any defect and damage affecting the safe operation, taking into account the minimum equipment list and configuration deviation list if available for the aeroplane type (See AMC OPS 1.890(a)(2));
(3) The accomplishment of all maintenance in accordance with the approved operator’s aeroplane maintenance program specified in JAR-OPS 1.910 (See AMC OPS 1.890(a)(3));
(4) The analysis of the effectiveness of the operator’s approved aeroplane maintenance programme (See AMC OPS 1.890(a)(4));
(5) The accomplishment of any operational directive, airworthiness directive and any other continued airworthiness requirement made mandatory by the Authority. (See AMC OPS 1.890(a)(5));
(6) The accomplishment of modifications in accordance with an approved standard and, for non-mandatory modifications, the establishment of an embodiment policy. (See AMC OPS 1.890(a)(6));

(b) An operator shall ensure that the Certificate of Airworthiness for each aeroplane operated remains valid in respect of:
(1) The requirements in sub-paragraph (a) above;
(2) Any calendar expiry date specified in the Certificate; and
(3) Any other maintenance condition specified in the Certificate.

(c) The requirements specified in sub-paragraph (a) above must be performed in accordance with procedures acceptable to the Authority.

AUA-OPS 1.893 Maintenance Management

(a) An operator must be appropriately approved in accordance with the requirements of AUA-RLW to carry out the requirements specified in JAR-OPS 1.890(a)(2), (3), (5) and (6) except when the Authority is satisfied that the maintenance can be contracted to an organization that is appropriately EASA Part 145 approved/accepted, and accepted by the Authority.

(b) An operator must employ a person or group of persons acceptable to the Authority to ensure that all mainte-

nance is carried out in accordance with the Maintenance Management Exposition, on time, and to an approved standard such that the maintenance responsibility requirements in AUA-OPS 1.890 are satisfied. The person, or senior person, as appropriate, is the nominated postholder referred to in JAR-OPS 1.175 (i)(2). The Nominated Postholder for maintenance is also responsible for any corrective action resulting from the quality monitoring of JAR-OPS 1.900(a). (See AMC OPS 1.895 (b)).

(c) The Nominated Postholder for Maintenance should not be employed by a maintenance organization under contract to the Operator, unless specifically agreed by the Authority. (See AMC OPS 1.895(c)).

(d) When an operator is not appropriately approved as a maintenance organization in accordance with AUA-RLW, or if an operator subcontracts accomplishment of its maintenance activities, arrangements must be made with a maintenance organization as referred to in AUA-OPS 1.875 (a)(1) or (a)(2) to carry out the requirements specified in AUA OPS 1.890(a)(2), (3), (5) and (6). Except as otherwise specified in paragraphs (e), (f) and (g) below, the arrangement must be in the form of a written maintenance contract between the operator and the maintenance organization detailing the functions specified in AUA-OPS 1.890(a)(2), (3), (5) and (6) and defining the support of the quality functions of AUA-OPS 1.900. Aeroplane base and scheduled line maintenance and engine maintenance contracts, together with all amendments, must be acceptable to the Authority. The Authority does not require the commercial elements of a maintenance contract. (See AMS OPS 1.895(d)).

(e) Notwithstanding paragraph (d) above, the operator may have a contract with an organization that is not EASA Part 145 approved/accepted, provided that:
(1) for aeroplane or engine maintenance contracts, the contracted organization is an Aruban AOC holder or a JAR-OPS Operator of the same type of aeroplane,
(2) all maintenance is ultimately performed by JAR-145 approved/accepted organizations,
(3) such a contract details the functions specified in AUA-OPS 1.890(a)(2), (3), (5) and (6) and defines the support of the quality functions of AUA-OPS 1.900,
(4) the contract, together with all amendments, is acceptable to the Authority. The Authority does not require the commercial elements of a maintenance contract. (See AMC OPS 1.895(e)).

(f) Notwithstanding paragraph (d) above, in the case of an aeroplane needing occasional line maintenance, the contract may be in the form of individual work orders to the Maintenance Organization. (See IEM-OPS 1.895(f)&(g)).

(g) Notwithstanding paragraph (d) above, in the case of aeroplane component maintenance, including engine maintenance, the contract may be in the form of individual work orders to the Maintenance Organization (See IEM-OPS 1.895(f)&(g)).

(h) An operator must provide suitable office accommodation at appropriate locations for the personnel specified in sub-paragraph (b) above. (See AMC OPS 1.895(h)).

AUA-OPS 1.900 Quality System

(a) For maintenance purposes, the operator's quality system, as required by JAR-OPS 1.035, must additionally include at least the following functions:
(1) Monitoring that the activities of JAR-OPS 1.890 are being performed in accordance with the acceptable procedures;
(2) Monitoring that all contracted maintenance is carried out in accordance with the contract; and
(3) Monitoring the continued compliance with the requirements of this Subpart.

(b) Where the operator is approved as a maintenance organization in accordance with AUA-RLW, the quality system may be combined with the quality system required by AUA-RLW.

AUA-OPS 1.905 Operator's Maintenance Management Exposition

(a) An operator must provide an operator's Maintenance Management Exposition containing details of the organization structure (See AMC OPS 1.905(a)) including:
(1) The nominated postholder responsible for the maintenance system required by JAR-OPS 1.175(i)(2) and the person, or group of persons, referred to in AUA-OPS 1.895(b));
(2) The procedures that must be followed to satisfy the maintenance responsibility of AUA-OPS 1.890 and the quality functions of AUA-OPS 1.900, except that where the operator is appropriately approved as a maintenance organization in accordance with AUA-RLW, such details may be included in the exposition required by AUA-RLW.

(b) The design of the operator's maintenance management exposition shall observe human factors principles.

(c) The operator shall ensure that the maintenance control manual is amended as necessary to keep the information contained therein up to date.

(d) An operator's maintenance management exposition and any subsequent amendment must be approved by the Authority.

(e) Copies of all amendments to the operator's maintenance management expositionshall be furnished promptly to

all organizations or persons to whom the manual has been issued.

(f) The operator shall provide the Authority and the State of Registry (if applicable) with a copy of the operator's maintenance management exposition, together with all amendments and/or revisions to it and shall incorporate in it such mandatory material as the Authority or the State of Registry (if applicable) may require.

AUA-OPS 1.910 Operator's Aeroplane Maintenance Programme

(a) An operator must ensure that the aeroplane is maintained in accordance with the operator's aeroplane maintenance programme. The programme must contain details, including frequency, of all maintenance required to be carried out. The programme will be required to include a reliability programme when the Authority determines that such a reliability programme is necessary. (See AMC OPS 1.910(b)).

(b) The operator's approved aeroplane maintenance programme must be subject to periodic reviews and amended when necessary. The reviews will ensure that the programme continues to be valid in light of operating experience whilst taking into account new and/or modified maintenance instructions promulgated by the Type Certificate holder. (See AMC OPS 1.910(b)).

(c) The operator's approved aeroplane maintenance programme must reflect applicable mandatory regulatory requirements addressed in documents issued by the Type Certificate holder to comply with JAR-21.61, or equivalent requirements issued by the State of Design. The maintenance programme shall include all information required by the authority. This includes, but shall not be limited to, the following:
1. maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aeroplane;
2. when applicable, a continuing structural integrity programme;
3. procedures for changing or deviating from (1) and (2) above; and
4. when applicable, condition monitoring and reliability programme descriptions for aircraft systems, components and engines.(See AMC OPS 1.910(c))

(d) The design of the operator's aeroplane Maintenance Programme shall observe human factors principles.

(e) An operator's aeroplane maintenance programme and any subsequent amendment must be approved by the Authority. (See AMC OPS 1.910(d)).

(f) Copies of all amendments to the operator's maintenance programme shall be furnished promptly to all organizations or persons to whom the manual has been issued.

AUA-OPS 1.915 Operator's Aeroplane Technical Log

(a) An operator must use an aeroplane technical log system containing the following information for each aeroplane:
(1) Information about each flight necessary to ensure continued flight safety;
(2) The current aeroplane certificate of release to service;
(3) The current maintenance statement giving the aeroplane maintenance status of what scheduled and out-of-phase maintenance is next due except that the Authority may agree to the maintenance statement being kept elsewhere;
(4) All outstanding deferred defects that affect the operation of the aeroplane; and
(5) Any necessary guidance instructions on maintenance support arrangements.

(b) The aeroplane technical log system and any subsequent amendment must be approved by the Authority.

AUA-OPS 1.920 Maintenance Records

(a) An operator shall ensure that the aeroplane technical log is retained for 24 months after the date of the last entry.

(b) An operator shall ensure that a system has been established to keep, in a form acceptable to the Authority, the following records for the periods specified:
(1) All detailed maintenance records in respect of the aeroplane and any aeroplane component fitted thereto – 24 months after the aeroplane or aeroplane component was released to service;
(2) The total time and flight cycles as appropriate, of the aeroplane and all life-limited aeroplane components – 12 months after the aeroplane has been permanently with drawn from service;
(3) The time and flight cycles as appropriate, since last overhaul of the aeroplane or aeroplane component subjected to an overhaul life – Until the aeroplane or aeroplane component overhaul has been superseded by another overhaul of equivalent work scope and detail;
(4) The current aeroplane inspection status such that compliance with the approved operator's aeroplane maintenance programme can be established – Until the aeroplane or aeroplane component inspection has been superseded by another inspection, of equivalent work scope and detail;

(5) The current status of airworthiness directives applicable to the aeroplane and aeroplane components – 12 months after the aeroplane has been permanently withdrawn from service; and

(6) Details of current modifications and repairs to the aeroplane, engine(s), propellers(s) and any other aeroplane component vital to flight safety – 12 months after the aeroplane has been permanently withdrawn from service; (See IEM OPS 1.920(b)(6)).

(c) An operator shall ensure that in the event of a temporary change of operator, the records shall be made available to the new operator. An operator shall ensure that when an aeroplane is permanently transferred from one operator to another operator the records specified in paragraphs (a) and (b) are also transferred and the time periods prescribed will continue to apply to the new operator. (See AMC OPS 1.920(c)).

AUA-OPS 1.925 Continuing Airworthiness

(a) The operator of an aeroplane over 5 700 kg maximum certificated take-off mass shall monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information as prescribed by the Authority and report through a system specified by the Authority.

(b) The operator of an aeroplane over 5 700 kg maximum certificated take-off mass shall obtain and assess continuing airworthiness information and recommendations available from the organization responsible for the type design and shall implement resulting actions considered necessary in accordance with a procedure acceptable to the Authority.

(c) All modifications and repairs shall comply with airworthiness requirements acceptable to the Authority. Procedures shall be established to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained.

AUA-OPS 1.930 Continued validity of the Air Operator Certificate in Respect of the Maintenance System

An operator must comply with JAR-OPS 1.175 and 1.180 to ensure continued validity of the air operator’s certificate in respect of the maintenance system.

AUA-OPS 1.935 Equivalent Safety Case

An operator shall not introduce alternative procedures to those prescribed in this Subpart unless needed and an equivalent safety case has first been approved by the Authority.

AUA-OPS 1.940(a)(2)

(2) The flight crew includes additional flight crew members when required by the type of aeroplane used, the type of operation involved and the duration of flight between points where flight crews are changed, and is not reduced below the number specified in the Operations Manual;

(3) All flight crew members hold an applicable and valid licence acceptable to the Authority and are suitably qualified and competent to conduct the duties assigned to them. The flight crew shall include at least one member who holds a valid licence, issued or rendered valid by the State of Registry, authorizing operation of the type of radio transmitting equipment to be used.

Appendix 2 to JAR-OPS 1.940
Single pilot operations under IFR or at night

(a) Aeroplanes referred to in JAR-OPS 1.940(b)(2) may be operated by a single pilot under IFR or at night when the following requirements are satisfied:

(1) The operator shall include in the Operations Manual a pilot's conversion and recurrent training programme which includes the additional requirements for a single pilot operation;

(2) In particular, the cockpit procedures must include:

(i) Engine management and emergency handling;
(ii) Use of normal, abnormal and emergency checklists;
(iii) ATC communication;
(iv) Departure and approach procedures;
(v) Autopilot management; and
(vi) Use of simplified in-flight documentation;

(3) The recurrent checks required by JAR-OPS 1.965 shall be performed in the single pilot role on the type or class of aeroplane in an environment representative of the operation;

(4) The pilot shall have a minimum of 50 hours flight time on the specific type or class of aeroplane under IFR of which 10 hours is as commander; and

(5) The minimum required recent experience for a pilot engaged in a single-pilot operation under IFR or at night shall be 5 IFR flights, including 3 instrument approaches, carried out during the preceding 90 days on the type or class of aeroplane in the single-pilot role. This requirement may be replaced by an IFR instrument approach check on the type or class of aeroplane.

(6) The flight manual does not require a flight crew of more than one.

(7) The maximum certificated take-off mass does not exceed 5700 kg.

Appendix 1 to OPS 1.965 item (a)(4)(iii)

4. *Crew Resource Management (CRM)*.

(i) Elements of CRM shall be integrated into all appropriate phases of recurrent training; and

(ii) A specific modular CRM training programme shall be established such that all major topics of CRM training are covered over a period not exceeding 3 years, as follows:

(A) Human error and reliability, error chain, error prevention and detection;

(B) Company safety culture, SOPs, organisational factors;

(C) Stress, stress management, fatigue and vigilance;

(D) Information acquisition and processing, situation awareness, workload management;

(E) Decision making;

(F) Communication and co-ordination inside and outside the cockpit;

(G) Leadership and team behavior, synergy;

(H) Automation and philosophy of the use of automation (if relevant to the type);

(I) Specific type-related differences;

(J) Case-based studies;

(K) Additional areas which warrant extra attention, as identified by the safety management system (see AUA-OPS 1.037).

(iii) Operators shall establish procedures to update their CRM recurrent training programme. Revision of the Programme shall be conducted over a period not exceeding 3 years. The revision of the programme shall take into account the de-identified results of the CRM assessments of crews, and information identified by the safety management system.

AUA-OPS 1.987 Spare correcting lenses

A flight crew member assessed as fit to exercise the privileges of a licence, subject to the use of suitable correcting lenses, shall have a spare set of the correcting lenses readily available when exercising those privileges.

AUA-OPS 1.1040 General rules for Operation Manuals

(a) An operator shall ensure that the Operations Manual contains all instructions and information necessary for operations personnel to perform their duties.
(b) An operator shall ensure that the contents of the Operations Manual, including all amendments or revisions, do not contravene the conditions contained in the Air Operator Certificate (AOC) or any applicable regulations and must be acceptable to, or, where applicable, approved by the Authority. (See IEM OPS 1.1040(b).)
(c) An operator must prepare the Operations Manual in the English language. In addition, an operator may translate and use that manual, or parts thereof, into another language. (See IEM OPS 1.1040(c).)
(d) Should it become necessary for an operator to produce new Operations Manuals or major parts or volumes thereof, he must comply with sub-paragraph (a) above.
(e) An operator may issue an Operations Manual in separate volumes.
(f) An operator shall ensure that all operations personnel have easy access to a copy of each part of the Operations Manual which is relevant to their duties. In addition, the operator shall supply crew members with a personal copy of, or sections from, Parts A and B of the Operations Manual as are relevant for personal study.
(g) An operator shall ensure that the Operations Manual is amended or revised so that the instructions and information contained therein are kept up to date. The operator shall ensure that all operations personnel are made aware of such changes that are relevant to their duties.
(h) Each holder of an Operations Manual, or appropriate parts of it, shall keep it up to date with the amendments or revisions supplied by the operator.
(i) An operator shall supply the Authority with intended amendments and revisions in advance of the effective date. When the amendment concerns any part of the Operations Manual which must be approved in accordance with JAR-OPS, this approval shall be obtained before the amendment becomes effective. When immediate amendments or revisions are required in the interest of safety, they may be published and applied immediately, provided that any approval required has been applied for.
(j) An operator shall incorporate all amendments and revisions required by the Authority.
(k) An operator must ensure that information taken from approved documents; and any amendment of such approved documentation, is correctly reflected in the Operations Manual and that the Operations Manual contains no information contrary to any approved documentation. However, this requirement does not prevent an operator from using more conservative data and procedures.
(l) An operator must ensure that the contents of the Operations Manual are presented in a form in which they can be used without difficulty.
(m) An operator may be permitted by the Authority to present the Operations Manual or parts thereof in a form other than on printed paper. In such cases, an acceptable level of accessibility, usability and reliability must be assured.
(n) The use of an abridged form of the Operations Manual does not exempt the operator from the requirements of JAR-OPS 1.130.

Appendix 1 to JAR-OPS 1.1045 item (A)(2.3)

2.3 *Safety Management System.* A description of the main aspects of the flight safety programme.

AUA-OPS 1.1050 Aeroplane Flight Manual

(a) An operator shall keep a current approved Aeroplane Flight Manual or equivalent document for each aeroplane that it operates.
(b) The Aeroplane Flight Manual shall be updated by implementing changes made mandatory by the Authority.

AUA-OPS 1.1060 (c), (d), (e) & (f)

(c) An operator must ensure that the operational flight plan content and its use are described in the Operations Manual.
(d) An operator shall ensure that all entries on the operational flight plan are made concurrently and that they are permanent in nature.
(e) The operational flight plan shall be completed for every intended flight and shall be approved by the commander, and where applicable, by the flight operations officer/flight dispatcher and a copy shall be filed with the operator or a designated agent, or, if these procedures are not possible, it shall be left with the aerodrome authority or on record in a suitable place at the point of departure.
(f) The operator shall determine the most efficient means of lodging the operational flight plan to the appropriate Air Traffic Services.

Appendix 1 to JAR–OPS 1.1065 Document storage periods (Table 1)

Table 1 – Information used for the preparation and execution of a flight

Information used for the preparation and execution of the flight as described in JAR–OPS 1.135	
Operational flight plan	3 months
Aeroplane Technical log	24 months after the date of the last entry
Route specific NOTAM/AIS briefing documentation if edited by the operator	3 months
Mass and balance documentation	3 months
Notification of special loads including written information to the commander about dangerous goods	3 months
Fuel and Oil Records	3months

AUA-OPS 1.1080 Objective, Scope and Responsibilties

(a) Objective and scope
An operator shall establish a flight and duty time limitations and rest (FTL) scheme for crew members.

(b) An operator shall ensure that for all its flights:
(1) The flight and duty time limitations rest scheme is in accordance with the provisions of this Sub Part.
(2) Flights are planned to be completed within the allowable flight and duty period taking into account the time necessary for pre-flight duties, the flight and turn-around times and the nature of operation.
(3) Duty rosters will be prepared and published sufficiently in advance to provide the opportunity for crew members to achieve adequate rest.

(c) Operators' Responsibilities
(1) An operator shall nominate a home base for each crew member.
(2) Operators are expected to appreciate the relationship between the frequency and pattern of flight duty periods and rest periods and give due consideration to the cumulative effects of undertaking long duty hours interspersed with minimum rest.
(3) Operators shall allocate duty patterns which avoid such undesirable practices as alternating day and night duties or the positioning of crew members so that a serious disruption of established sleep and work pattern occurs.
(4) Planning local days off free of duty and notifying crew members in advance.
(5) Operators shall ensure that rest periods provide sufficient time to enable crew members to overcome the effects of the previous duties and to be well rested by the start of the following flight duty period.
(6) Operators shall ensure flight duty periods are planned to enable crew members to remain sufficiently free from fatigue so they can operate to a satisfactory level of efficiency and safety under all circumstances.

(d) Crew Member's Responsibilities
(1) A crew member shall not operate on aeroplane if he/she knows or suspects that he/she is suffering from or is likely to suffer from fatigue, or feels unfit to the extent that the flight may be endangered.
(2) Crew members should make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

(e) Variations
(1) Subject to the common review procedure, the Authority may grant variations to the requirements in this Sub Part for special types of operations or to meet specific operational needs in accordance with applicable laws and procedures in consultation with all interested parties.
(2) Each operator will have to demonstrate to the Authority using current scientific knowledge and operational experience, that its request for a variation produces an equivalent level of safety. Such variations will be accompanied with suitable mitigation measures.
(3) In deciding to grant a variation, the Authority shall take into account all the requirements of this sub part. Such variations *should* be granted only in isolation or in limited combinations.

AUA-OPS 1.1085 Definitions

(a) Definitions

Augmented Crew: A flight crew which comprises more than the minimum number required for the operation of the aeroplane and in which each flight crew member can leave his/her post and be replaced by another appropriately qualified flight crew member.

Block Time: The time between an aeroplane first moving from its parking place for the purpose of taking off until it comes to rest on the designated parking position and until all engines are stopped.

Break: A period free of all duties, which counts as duty, being less than a rest period.

Day Off: Periods of time available for leisure and relaxation free from all duties. A single day off shall include two local nights. Consecutive days off shall include a further local night for each additional consecutive day off. A rest period may be included as part of a day off.

Duty: Any task that a flight crew member is required to carry out associated with the business of an AOC holder.

Duty Period: A period which starts when the crew member is required by an operator to report for a duty and ends when the crew member is free from all duties.

Flight Duty Period (FDP): A Flight Duty Period (FDP) is any time during which a person operates in an aircraft as a member of its crew. The FDP starts when a crew member is required by an operator to report for a flight or series of flights; and it finishes at the end of the last flight on which he/she is an operating crew member or other time as specified by the Department of Civil Aviation.

Home Base: The location nominated by the operator to the crew member from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal conditions, the operator is not responsible for the accommodation of the crew member concerned.

Local Day: A 24 hour period commencing at 00:00 local time.

Local Night: A period of eight hours falling between 22:00 hours and 08:00 hours local time.

Operating crew member: A crew member who carries out his/her duties in an aircraft during a flight or during any part of a flight.

Positioning: The transferring of a non-operating crew member from place to place, at the behest of the operator, excluding travelling time. Travelling time being defined as:

- time from home to a normal reporting place;
- time for local transfer from a place of rest to the commencement of duty.

Reporting Time: The time at which a crew member is required by the operator to report for any duty.

*Rostered/Planned Duty***:** A duty period, or series of duty periods, with stipulated start and finish times, notified by the company to crew in advance.

Rest Period: An uninterrupted and defined period of time which a crew is free from all duties. A flight crew member shall not be disturbed during a rest period.

Single Day Free of Duty: A single day free of duty shall include two local nights. A rest period may be included as part of the day off.

Standby: A defined period of time during which a crew member is required by the operator to be available to receive an assignment for a flight, positioning or other duty without an intervening rest period.

*Suitable Accommodation***:** A well-furnished bedroom which is subject to minimum noise, is well ventilated, and has the facility to control the levels of light and temperature.

Time Zone Adapted: To become time zone adapted a crew member must achieve 3 consecutive local nights free of duty on the ground in a time zone which is no more than two hours wide. He/she will remain time zone adapted until he/she becomes time zone adapted to another time zone or, becomes non- time zone adapted by finishing a duty period at a place where local time differs by more than two hours from that to which he/she is time zone adapted.

Travelling: Time spent by a crew member transferring between his/her place of rest and the place of reporting (see section 2.5).

Window of Circadian Low (WOCL): The Window of Circadian Low (WOCL) is the period between 02:00 and 06:00 hours. Within a band of three time zones the WOCL refers to home base time. Beyond these three time zones the WOCL refers to home base time for the first 48 hours after departure from home base time zone and to local time thereafter.

AUA-OPS 1.1090 Flight Periods, Duty Periods and Duty Rest Periods
(See Appendix 1 to AUA-OPS 1.1090)

(a) Flight and Duty Limits

(1) Cumulative Limit on Flying Hours

An operator shall ensure that the total block times of the flights on which an individual crew member is assigned as an operating crew member does not exceed:

(a) 1000 hours in a calendar year, spread as evenly as practicable throughout the year;

(b) 100 hours in any 30 consecutive days.

(2) Cumulative Duty Hours
An operator shall ensure that the total duty periods to which a crew member is assigned do not exceed:
2.1 190hours in any 28 consecutive days
2.2 60 hours in any 7 consecutive days

(3) Maximum daily Flight Duty Period (FDP)

3.1 An operator shall specify reporting times that realistically reflect the time for safety related ground duties as approved by the Department of Civil Aviation.

3.2 The maximum basic daily FDP is 13 hours.

3.3 These 13 hours will be reduced by 30 minutes for each sector from the third sector onwards with a maximum reduction for sectors of two hours.

3.4 When the FDP starts in the WOCL, the maximum stated in 3.2 and 3.3 will be reduced by 100% of its encroachment up to a maximum of two hours. When the FDP ends in or fully encompasses the WOCL, the maximum FDP stated in 3.2 and 3.3 will be reduced by 50% of its encroachment (see Appendix 1 to AUA-OPS 1.1090).

3.5 Extensions:
(a) The maximum daily FDP can be extended by up to one hour.
(b) Extensions are not allowed for a basic FDP of 6 sectors or more.
(c) Where an FDP encroaches on the WOCL by up to two hours extensions are limited to up to four sectors.
(d) Where an FDP encroaches on the WOCL by more than two hours extensions are limited to up to two sectors.
(e) The maximum number of extensions is two between two periods of weekly rest.
(f) Where an FDP is planned to use an extension pre and post flight minimum rest is increased by two hours or post flight rest only is increased by four hours. Where the extensions are used for consecutive FDPs the pre and post rest between the two operations shall run concurrently.

3.6 For Cabin Crew members assigned to the same flight or series of flights as flight crew members the maximum FDP may be exceeded by up to one hour the FDP of the flight crew members up to a maximum FDP of 14:00 hours. The operator may base the allowable flight duty period upon the flight crew's reporting time.

3.7 Operational Robustness
Planned schedules must allow for flights to be completed within the maximum permitted flight duty period. To assist in achieving this, operators will take action to change a schedule or crewing arrangements where the operation fails to achieve 66% regularity within the maximum FDP.

(4) Night Duties
A crew member may be scheduled for no more than 3 consecutive duties that encroach on the period 01:00 to 06:59 local time within any 7 consecutive days.

(5) Positioning & Travelling
5.1 All time spent on positioning is counted as duty.
5.2 Positioning after reporting but prior to operating shall be included as part of the FDP but shall not count as a sector.

(6) Delayed Reporting Time in a Single FDP
6.1 When a crew member is informed of a delay to the reporting time due to a changed schedule, before leaving the place of rest and within a maximum of ninety minutes before start of the rostered FDP, the FDP shall be calculated as follows.
When the delay is less than 4 hours, the maximum FDP allowed shall be based on the original reporting time and the FDP shall start at the actual report time. Where the delay is 4 hours or more, the maximum FDP shall be based on the more limiting time band of the planned and the actual report time and the FDP starts 4hours after the original report time.
6.2 When an operator informs a crew member before leaving the place of rest of a delay in reporting time of 10 hours or more ahead, and that crew member is not further disturbed by the operator until a mutually agreed hour, then that elapsed time is classed as a rest period. If, upon the resumption of duty, further delays occur, then the

appropriate criteria in this paragraph and paragraph 6.1 above shall be applied to the re-arranged reporting time.

(b) Rest

(1) Minimum Rest
1.1 The minimum rest which must be provided before undertaking a flight duty period starting at home base shall be at least as long as the preceding duty period or 12 hours whichever is the greater.
1.2 The minimum rest period which must be provided before undertaking a flight duty period starting away from home base shall be at least as long as the preceding duty period or 10 hours whichever is the greater; when on minimum rest away from base, the operator must allow for an 8 hours' sleep opportunity taking due account of travelling as well as other physiological needs.

(2) Rest Periods
An operator shall ensure that the minimum rest provided outlined above is increased to at least one 36 hour period including two local nights; there must be no more than 168 hours between successive weekly rest periods.

(c) Flight Duty Period Extension

(1) Flight Crew Augmentation

1.1 Augmentation 1
On aircraft where the standard crew is only two pilots and is augmented with anadditional single qualified light crew member (see JAR-OPS 1 for Aruba Sub Part N, Appendix 1, JAR-OPS 1.940):
(a) The operator must provide a comfortable reclining seat separated and screened from the flight deck and the passenger.
(b) The maximum FDP is 16 hours irrespective of encroachment of the WOCL.

1. 2 Augmentation 2
On aircraft where the standard crew is only two pilots and is augmented with an additional single qualified flight crew member (see JAR-OPS 1 for Aruba Sub Part N, Appendix 1, JAR-OPS 1.940):
(a) The operator provides a bunk screened from the flight deck and passengers,
(b) The maximum FDP is 18 hours irrespective of encroachment of the WOCL.

1.3 Augmentation 3
On aircraft where the standard crew is only two pilots and is augmented with two additional qualified flight crew member (see JAR-OPS 1 for Aruba Sub Part N, Appendix 1, JAR-OPS 1.940):
(a) The operators must provide bunks separated and screened from the flight deck and passengers.
(b) The maximum FDP is 20 hours irrespective of encroachment of the WOCL.

1.4 General
In all cases where the flight crew are augmented the sharing of time away from task by crew members leaving their posts should be kept in balance. With reference to the provisions of dedicated crew rest facilities, as defined in 1.1, 1.2 and 1.3 above, these will be progressively introduced in conjunction with the acquisition of new aircraft types.

(2) Cabin Crew
An Operator will agree with the authority the legal minimum in-flight rest required by cabin crew member(s) when the FDP goes beyond the limitations of paragraph 3 above. The authority must take into account the crew rest facilities provided on board the aircraft in reaching their decision. Cabin Crew carried in excess of the minimum necessary to meet safety requirements may be counted as augmented crew for the purposes of calculating the maximum permitted FDP and in-flight rest requirements. In the case where Cabin Crew are augmented crew members leaving their posts should be kept in balance.

(3) Extended FDP (Split Duty)
Provided than an adequate level of safety is demonstrated, an operation based on an extended FDP including a break can be granted by the authority based on existing national legal provision.

(d) Unforeseen circumstances in actual flight operations- Commanders' Discretion
(1) Taking into account the need for careful control of these instances implied in 3.2 underneath, during the actual flight operation, which starts at the reporting time, the limits on flight duty, duty and rest periods prescribed in this Sub Part may be modified in the event of unforeseen circumstances. Any such modifications

must be acceptable to the commander after consultation with all other crew members and must, in all circumstances, comply with the following:

1.1 The allowable flight duty period may not be increased by more than 2 hours unless:

(a) The flight crew has been augmented, in which case the allowable flight duty period may be increased by not more than 3 hours.

(b) For Cabin Crew as augmented in accordance with paragraph 2 of this Sub Part, the allowable flight duty period may be extended by not more than 3 hours.

1.2 If on the final sector within a flight duty period unforeseen circumstances occur after take-off that will result in the permitted increase being exceeded, the flight may continue to the planned destination or alternate; and

1.3 The rest period may be reduced but never below the minimum rest defined in paragraph (b)(1) of this Sub Part.

2. The commander shall, in the case of special circumstances which might lead to fatigue and after consultation with the crew members affected, reduce the actual flight duty time and/or increase the rest time for the purposes of eliminating any adverse effects on flight safety.

3. An operator shall ensure that:

3.1 The Commander submits a report to the operator whenever a flight duty period is increased by his/her discretion or when a rest period is reduced in actual flight operation; and

3.2 Where the increase of a flight duty period or reduction of a rest period exceeds one hour, a copy of the report, to which the operator must add his comments, is sent to the Authority no later than 28 days after the event.

(e) Standby

(1) Airport Standby

1.1 A crew member is on Airport Standby from reporting at the normal report point until to the end of the notified standby period.

1.2 Airport Standby duty will count in full for the purposes of cumulative duty hours totals.

1.3 Airport Standby duty shall be followed by at least a minimum rest period.

1.4 If called for duty, the standby time counts for 50% towards the total cumulative duty hours and flight duty period as prescribed in 2.2 and 2.3.

1.5 Whilst on airport standby, the operator will provide a quiet and comfortable place for the crewmember which is not open to the public.

(2) Other Forms of Standby

2.1 Standby periods shall be scheduled and notified at least 24 hours in advance;

2.2 The maximum duration of Standby duty will not exceed 12 hours.

2.3 Standby duty commences at start of standby period and ends at report time.

2.4 Standby is duty and counts in full towards total cumulative duty hours if not called for duty.

2.5 Rest period after standby duty is at least equal to period from start of standby to end of Duty Period.

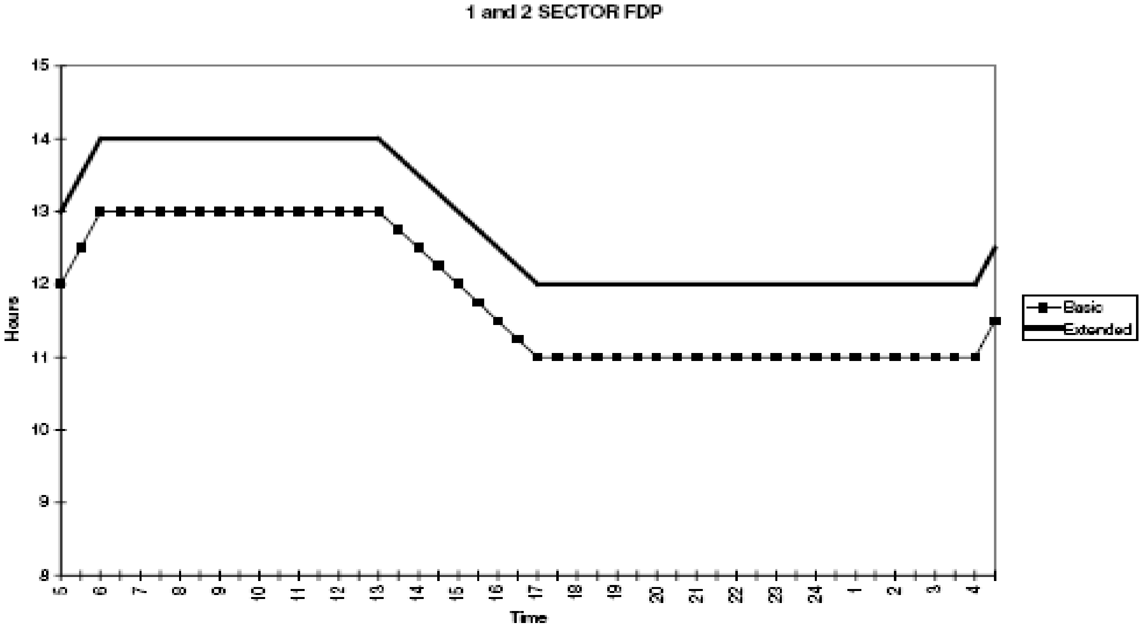
2.6 The need to be rested for an assigned flight duty from standby is a common responsibility between Crew Member and Operator.

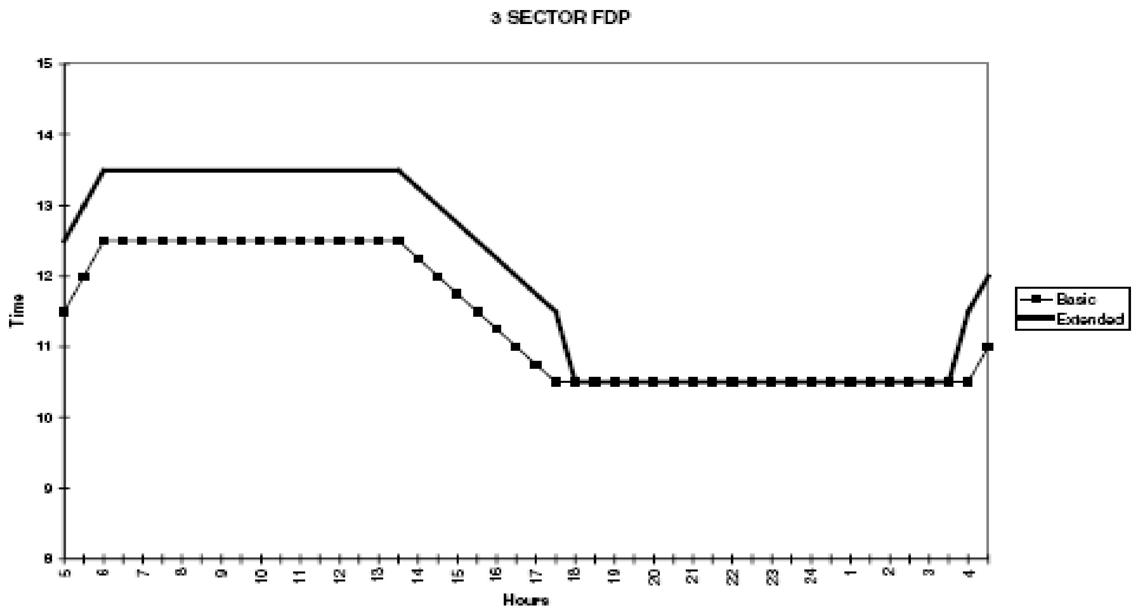
2.7 Reserve (Contactable/On-Call): A scheduled period of time during a day, other than a day off, of between 2 and 4 hours between 08:00 and 20:00 local time during which an operator may expect to be able to contact a crew member solely for notification of duty the next day (more than 12 hours in advance). Such periods do not count in cumulative duty totals and are not standby. There are no constraints on crew activity whilst on reserve.

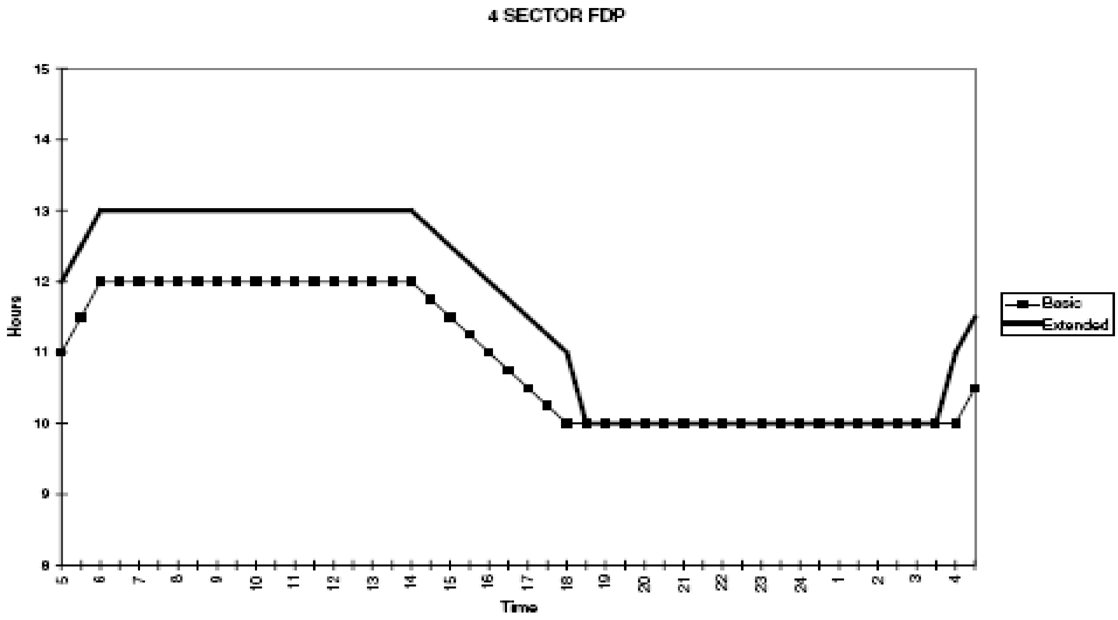
2.8 A crew member is on standby from the beginning to the end of the notified standby period or until actual report time for duty having been called during the standby period.

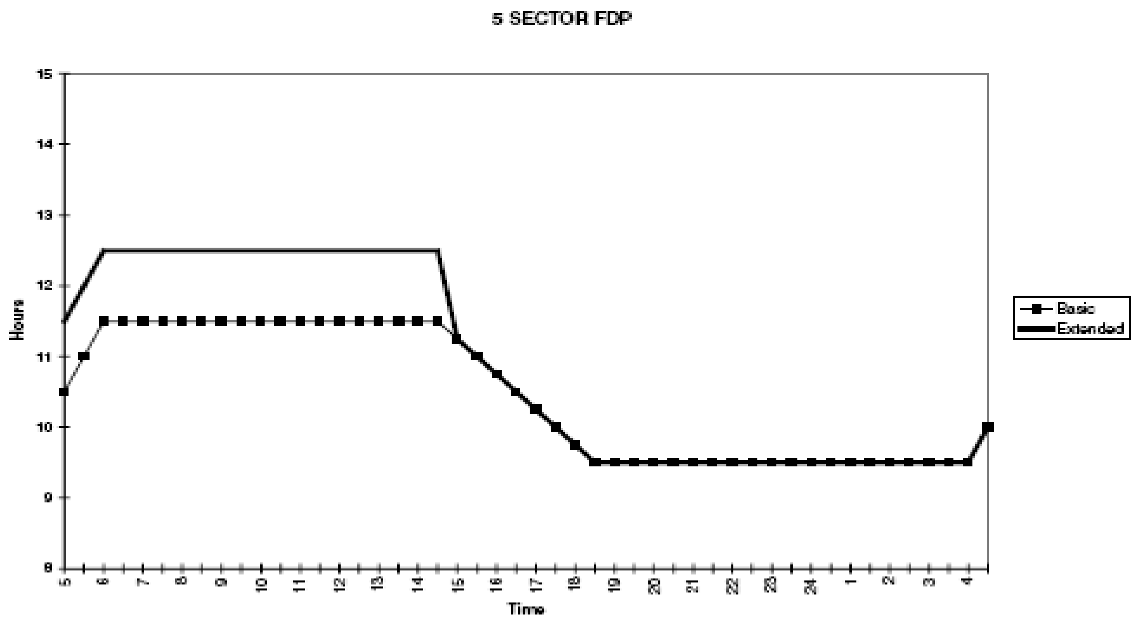
2.9 A crew member shall not be contacted to report for a duty which starts more than 2 hours after the end of the standby period.

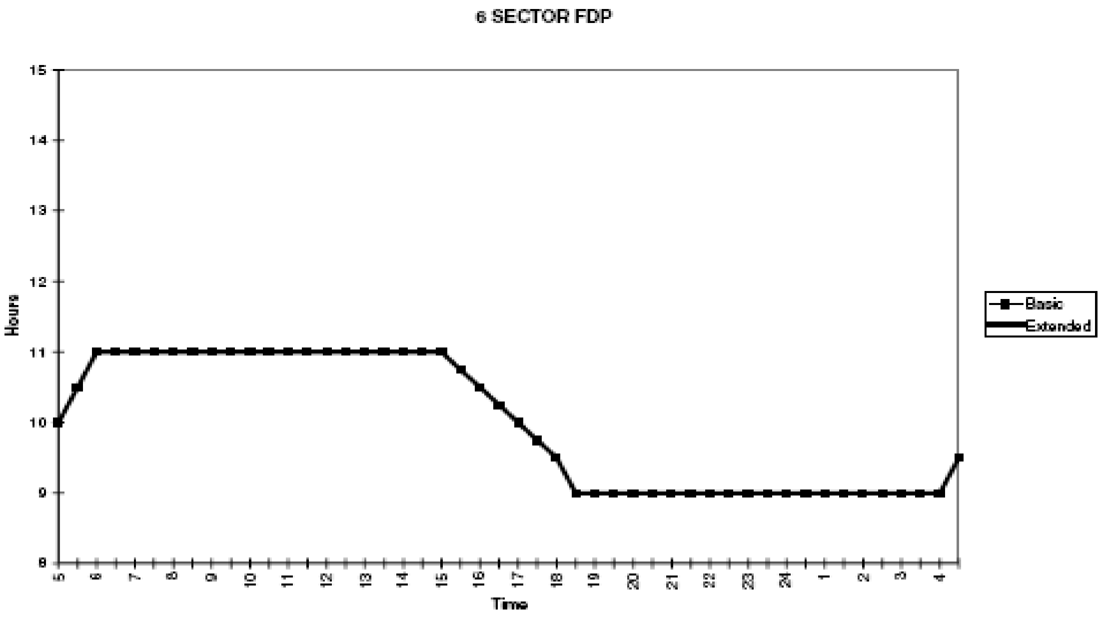
Appendix 1 to AUA-OPS1.1090
Flight Periods, Duty Periods and Duty Rest Periods






4 SECTOR FDP
Hours
Time
Basic
Extended


5 SECTOR FDP
Hours
Time
Basic
Extended


6 SECTOR FDP
Hours
Time
Basic
Extended

AUA-OPS 1.1095 Nutrition

Crew members and operators should be aware that a lack of sustenance could prove detrimental to an individual's performance and level of vigilance. Meal opportunities should occur sufficiently frequently in order to avoid any detriment to a crew member's erformance.
Where the FDP exceeds 6 hours, a meal opportunity shall be built into the schedule.

AUA-OPS 1.1100 Records

(a) Flight Duty, Duty and Rest period records
1.1An operator shall ensure that crew member's records include:
a) Block times;
b) Start, duration and end of each duty or flight duty periods;
c) Rest periods and days free of all duties, and are maintained to ensure compliance with the requirements of this Sub Part.
1.2 Copies of these records will be made available to the crew member upon request.

(b) All crew members shall maintain an individual record, as appropriate, of their:
1. Block times;
2. Flight duty periods;
3. Duty periods; and
4. Rest periods and local days free of all duties, which must be presented to any operator who employs his/her services before he/she commences a flight duty period.

(c) Records shall be preserved for at least 15 calendar months from the date of the last relevant entry.

(d) Additionally, operators shall separate and retain all aircraft commanders' discretion reports of extended flying duty periods, extended flying hours, and reduced recovery periods for a period of at least six months after the event.

AUA-OPS 1.1105

Reserved

AUA-OPS 1.1240 Training programmes (See ACJ OPS 1.1240)

(a) An operator shall establish, maintain and conduct approved training programmeswhich enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of aeroplanes and to minimise the consequences of such events, should they occur. The training programme shall be compatible with the National Aviation Security programme. Individual crew member shall have knowledge and competence of all relevant elements of the training programme.

(b) An operator shall also establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on an aeroplane so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

(c) As a minimum, this programme shall include the following elements:
(1) determination of the seriousness of any occurrence;
(2) crew communication and coordination;
(3) appropriate self-defence responses;
(4) use of non-lethal protective devices assigned to crew members whose use is authorized by the Authority;
(5) understanding of behaviour of terrorists so as to facilitate the ability of crew members to cope with hijacker behaviour and passenger responses;
(6) live situational training exercises regarding various threat conditions;
(7) flight crew compartment procedures to protect the aeroplane; and
(8) aeroplane search procedures and guidance on least-risk bomb locations where practicable.

(d) An operator shall also establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on an aeroplane so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

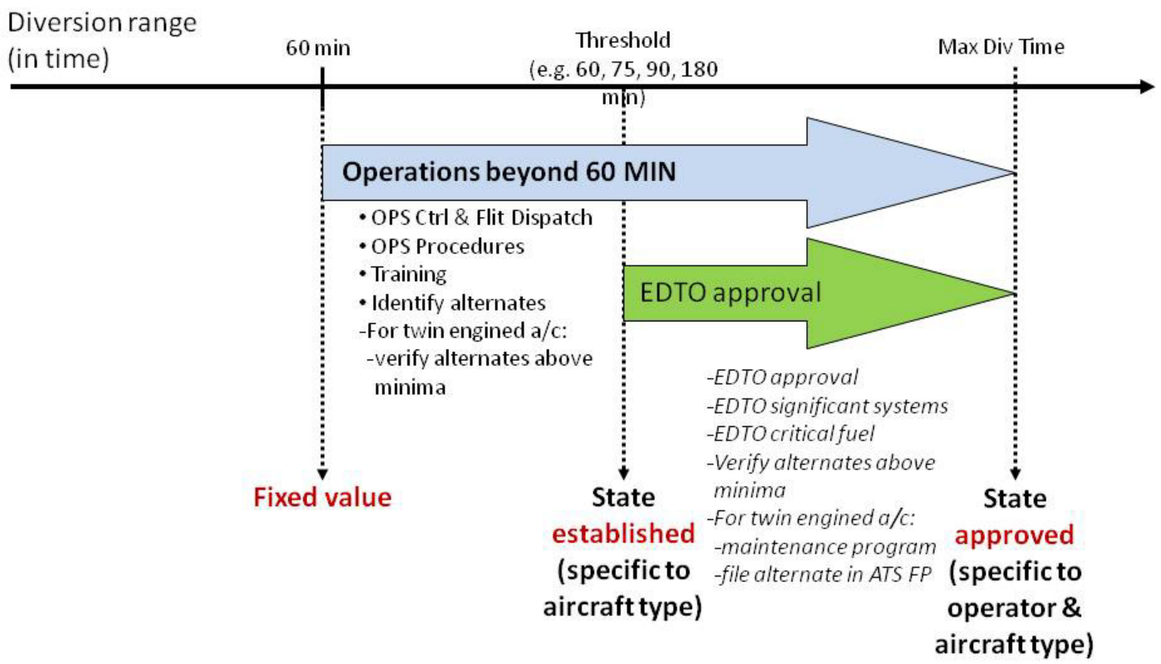
AMC-OPS 1.245
Guidance for Operations by turbine engine aeroplanes beyond 60 minutes to an en-route alternate aerodrome including extended diversion time operations (EDTO)
See AUA-OPS 1.245

1. Introduction

1.1 The purpose of this AMC is to provide guidance on the general provisions relating to operations by turbine engine aeroplanes beyond 60 minutes flying time to an en-route alternate aerodrome and extended diversion time operations contained in AUA-OPS 1.245 and 1.246. The guidance also assists the Authority in establishing a threshold time and approving the maximum diversion time for a given operator with a specific aeroplane type. The provisions in AUA-OPS 1.245 and 1.246 are divided into:
a) the basic provisions that apply to all aeroplanes operating beyond 60 minutes to an en-route alternate aerodrome and;
b) provisions to fly beyond a threshold time, and up to a maximum diversion time, approved by the Authority, that may be different for each operator/aeroplane type combination. This AMC provides guidance on the means of achieving the required level of safety envisaged.

1.2 Similar to the threshold time, the maximum diversion time is the range (expressed in time) from a point on a route to an en-route alternate aerodrome up to which the Authority will grant approval. When approving the operator's maximum diversion time, the Authority will need to consider not only the capable range of the aircraft, taking into consideration any limitation of the aeroplanes type certificate, but also the operator's previous experience on similar aircraft types and routes.

Figure 1: Generic EDTO graphical representation.



1.3 The material in this AMC is organized to address guidance on operations beyond 60 minutes to an en-route alternate aerodrome for all airplanes with turbine engines (Section 2) and guidance for extended diversion time operations (Section 3). The EDTO section is further divided into general provisions (Section 3.1), provisions that apply to aeroplanes with more than two engines (Section 3.2) and provisions that apply to aeroplanes with two engines (Section 3.3). The two engine and more than two engine aeroplane sections are organized exactly the same way. It should be noted that these sections may appear to be similar and thus repetitive, however there are requirement differences based on the aeroplane type. The reader should see Section 2, 3.1 and then either 3.2 for aeroplanes with more than two engines or 3.3 for aeroplanes with two engines.

2. Operations by aeroplanes with turbine engines beyond 60 minutes to an en-route alternate aerodrome

2.1 General

2.1.1 All provisions for operating by aeroplanes with turbine engines beyond 60 minutes to an en-route alternate aerodrome also apply to extended diversion time operations (EDTO).

2.1.2 In applying the requirements for aeroplanes with turbine engines in AUA-OPS 1.245 and 1.246, it should be understood that:
a) operational control refers to the exercise by the operator of responsibility for the initiation, continuation, termination or diversion of a flight;
b) flight dispatch procedures refer to the method of control and supervision of flight
operations. This does not imply a specific requirement for licensed flight dispatchers or a full flight following system;
c) operating procedures refer to the specification of organization and methods established to exercise operational control and flight dispatch procedures in the appropriate manual(s) and should cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight as well as the method of control and supervision of flight operations; and
d) training programme refers to the training for pilots and flight operations officers/flight dispatchers in operations covered by this and following sections.

2.1.3 Aeroplanes with turbine engines operating beyond 60 minutes to an en-route alternate aerodrome are not required to have specific additional approval by the Authority except if they engage in extended diversion time operations.

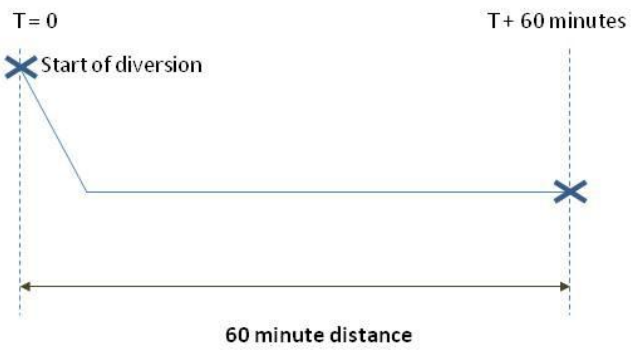
<u>2.2 Conditions to be used when converting diversion times to distances</u>

2.2.1 For the purpose of this guidance, an “approved one-engine-inoperative (OEI) speed” or “approved all-engine-operative (AEO) speed” is any speed within the certified flight envelope of the aeroplane.

2.2.2 Determination of the 60 minute distance – aeroplanes with two turbine engines

2.2.2.1 For determining whether a point on the route is beyond 60 minutes to an en-route alternate, the operator should select an approved one-engine-inoperative (OEI) speed. The distance is calculated from the point of the diversion followed by cruise for 60 minutes, in ISA and still air conditions as shown in the figure 2 below. For the purposes of computing distances, credit for driftdown may be taken.

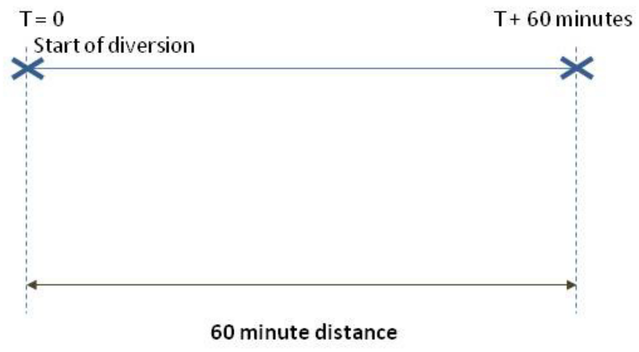
Figure 2: 60 min distance - Aeroplanes with two turbine engines



2.2.3 Determination of the 60 minute distance – aeroplanes with more than two turbine engines

2.2.3.1 For determining whether a point on the route is beyond 60 minutes to an en-route alternate, the operator should select an approved all-engine-operative (AEO) speed. The distance is calculated from the point of the diversion followed by cruise for 60 minutes, in ISA and still air conditions as shown in the figure 3 below.

Figure 3: 60 min distance - Aeroplanes with more than two turbine engines



2.3 Training

2.3.1 Training programmes should ensure requirements of JAR-OPS 1.975 are complied with such as but not limited to, route qualification, flight preparation, concept of extended diversion time operations and criteria for diversions.

2.4 Flight dispatch and operational requirements

2.4.1 In applying the general flight dispatch requirements of Subpart D of JAR-OPS 1 for Aruba, particular attention should be paid to the conditions which might prevail any time that the operation is beyond 60 minutes to an en-route alternate aerodrome, e.g. systems degradation, reduced flight altitude, etc. For compliance with the requirements of AUA-OPS 1.245 and 1.246, at least the following aspects should be considered:
a) identify en-route alternate airports;
b) ensure that prior to departure the flight crew is provided with the most up-to-date information on the identified en-route alternate aerodromes, including operational
status and meteorological conditions and, in flight, make available means for the flight crew to obtain the most up-to-date weather information;
c) methods to enable two-way communications between the aeroplane and the operator's operational control centre;
d) ensure that the operator has a means to monitor conditions along the planned route including the identified alternate airports and ensure that procedures are in place so that the flight crew are advised of any situation that may affect the safety of flight;
e) ensure that the intended route does not exceed the established aeroplane threshold time unless the operator is approved for EDTO operations;
f) pre-flight system serviceability including the status of items in the minimum equipment list;
g) communication and navigation facilities and capabilities;
h) fuel requirements; and
i) availability of relevant performance information for the identified en-route alternate aerodrome(s).

2.4.2 In addition, operations conducted by aeroplanes with two turbine engines require that prior to departure and in flight, the meteorological conditions at identified en-route alternate aerodromes will be at or above the aerodrome operating minima required for the operation during the estimated time of use.

2.5 En-route alternate aerodromes

2.5.1 Aerodrome(s) to which an aircraft may proceed in the event that a diversion becomes necessary while en route, where the necessary services and facilities are available, where aircraft performance requirements can be met, and which are expected to be operational if required, need to be identified any time that the operation is beyond 60 minutes to an en-route alternate aerodrome.
Note.— En-route alternate aerodromes may also be the take off and/or destination aerodromes.

3. **Extended diversion time operations (EDTO) requirements**

3.1 Basic concept

3.1.1 This section addresses provision that apply in addition to those in Section 2 of this AMC to operations by aeroplanes with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority (extended diversion time operations).

3.1.2 EDTO significant systems

3.1.2.1 EDTO significant systems may be the aeroplane propulsion system and any other aeroplane systems whose failure or malfunctioning could adversely affect safety particular to an EDTO flight, or whose functioning is specifically important to continued safe flight and landing during an aeroplane EDTO diversion.

3.1.2.2 Many of the aeroplane systems which are essential for non-extended diversion time operations may need to be reconsidered to ensure that the redundancy level and/or reliability will be adequate to support the conduct of safe extended diversion time operations.

3.1.2.3 The maximum diversion time should not exceed the value of the EDTO significant system limitation(s), if any, for extended diversion time operations identified in the Aeroplane's Flight Manual directly or by reference, reduced with an operational safety margin, commonly 15 minutes, specified by the Authority.

3.1.2.4 The specific safety risk assessment to approve operations beyond the time limits of an EDTO significant time-limited system per the provisions in AUA-OPS 1.245(c) should be based on the safety risk management guidance contained in the ICAO Safety Management Manual (Doc 9859). Hazards should be identified and safety risks assessed according to predicted probability and the severity of the consequences based on the worst foreseeable situation. When addressing the following components of the specific safety risk assessment it should be understood that:
a) capabilities of the operator refer to the operator's quantifiable in-service experience, compliance record, aeroplane capability, and overall operational reliability that:
1) is sufficient to support operations beyond the time limits of an EDTO significant time-limited system;
2) demonstrate the ability of the operator to monitor and respond to changes in a timely manner; and
3) there is an expectation that the operator's established processes,necessary for successful and reliable extended diversion time operations, can be successfully applied to such operations;
b) overall reliability of the aeroplane refers:
1) to quantifiable standards of reliability taking into account the number of engines, aircraft EDTO significant systems and any other factors that may affect operations beyond the time limits of a particular EDTO significant time limited system; and
2) relevant data from the aeroplane manufacturer and data from the operator reliability program used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems;
c) reliability of each time limited system refers to quantifiable standards of design, testing and monitoring that ensure the reliability of each particular EDTO significant time limited system;
d) relevant information from the aeroplane manufacturer refers to technical data and characteristics of the aeroplane and worldwide fleet operational data provided by the manufacturer and used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems; and
e) specific mitigation measures refer to the safety risk management mitigation strategies, which have manufacturer concurrence, that ensure an equivalent level of safety is maintained. These specific mitigations shall be based on:
1) technical expertise (e.g. data, evidence) proving the operator's eligibility for an approval of operations beyond the time limit of the relevant EDTO significant system; and
2) an assessment of relevant hazards, their probability and severity of the consequences that may adversely impact the safety of the operation, of an aeroplane operated beyond the limit of a particular EDTO significant time limited system.

3.1.3 Threshold time

3.1.3.1 It should be understood that the threshold time established in accordance with AUA-OPS 1.245 is not an operating limit. It is a flight time to an en-route alternate aerodrome, which is established by the Authority as being the EDTO threshold beyond which particular consideration should be given to the aeroplane capability as well as the operator's relevant operational experience, before granting an EDTO approval.

3.1.4 Maximum diversion time

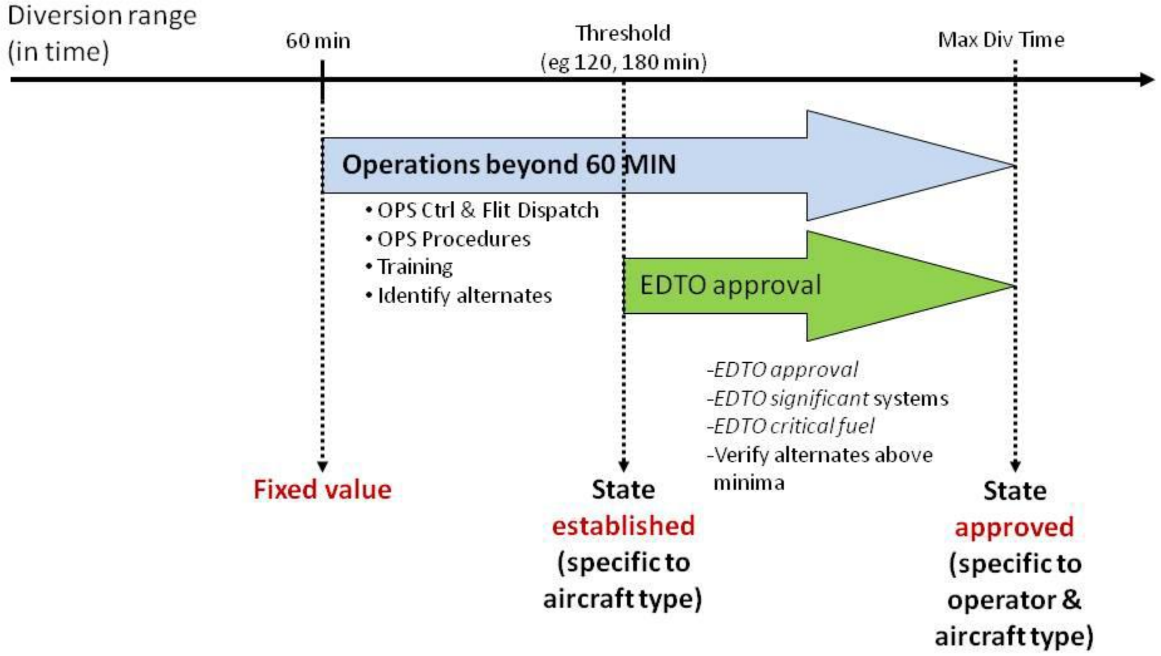
3.1.4.1 It should be understood that the maximum diversion time approved in accordance with AUA-OPS 1.245 should take into consideration the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane's Flight Manual (directly or by reference) for a particular aeroplane type and the operator's operational and EDTO experience, if any, with the aeroplane type, or if relevant with another aeroplane type or model.

3.2 EDTO for aeroplanes with more than two turbine engines

3.2.1 General

3.2.1.1 This section addresses provision that apply in addition to those in Sections 2 and 3.1 of this Attachment in particular to aeroplanes with more than two turbine engines.
Note.— EDTO may be referred to as ETOPS in some documents.

Figure 4: Generic EDTO graphical representation for aeroplanes with more than two turbine engines.



3.2.2 Operational and diversion planning principles

3.2.2.1 When planning or conducting, extended diversion time operations, an operator and pilot-in-command, should ensure that:
a) when planning an EDTO flight, the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes and aeroplane performance, are appropriately considered;
b) if no more than one engine is shut down, the pilot-in-command may elect to continue beyond the nearest en-route alternate aerodrome (in terms of time) if he determines that it is safe to do so. In making this decision the pilot-in-command should consider all relevant factors; and
c) in the event of a single or multiple failure of an EDTO significant system or systems (excluding engine failure), proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety results from any decision made to continue the planned flight.

3.2.2.2 EDTO critical fuel

3.2.2.2.1 An aeroplane with more than two engines engaged in EDTO operations should carry enough fuel to fly to an en-route alternate aerodrome as described in Section 3.2.6 of this AMC. This EDTO critical fuel corresponds to the additional fuel that may be required to comply with AUA-OPS 1.255(c)(3)(iv).

3.2.2.2.2 The following should be considered, using the anticipated mass of the aeroplane, in determining the corresponding EDTO critical fuel:

a) fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting;

1) the speed selected for the diversions (i.e. depressurization, combined or not with an engine failure) may be different from the approved all-engine operative speed used to determine the EDTO threshold and maximum diversion distance (see 3.2.8);
b) fuel to account for icing;
c) fuel to account for errors in wind forecasting;
d) fuel to account for holding, an instrument approach and landing at the en-route alternate aerodrome;
e) fuel to account for deterioration in cruise fuel burn performance; and
f) fuel to account for APU use (if required).

3.2.2.3 The following factors may be considered in determining if a landing at a given aerodrome is the more appropriate course of action:
a) aeroplane configuration, weight, systems status, and fuel remaining;
b) wind and weather conditions en-route at the diversion altitude, minimum altitudes en-route and fuel consumption to the en-route alternate aerodrome;
c) runways available, runway surface condition, weather, wind and terrain, in proximity of the en-route alternate aerodrome;
d) instrument approaches and approach/runway lighting available, rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;
e) the pilot's familiarity with that aerodrome and information about that aerodrome provided to the pilot by the operator; and
f) facilities for passenger and crew disembarkation and accommodation.

3.2.3 Threshold time

3.2.3.1 In establishing the appropriate threshold time and to maintain the required level of safety, the Authority will consider the following:
a) the airworthiness certification of the aeroplane type does not restrict operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;
b) specific flight dispatch requirements are met;
c) necessary in-flight operational procedures are established; and
d) the operator's previous experience on similar aircraft types and routes.

3.2.3.2 For determining whether a point on a route is beyond the EDTO threshold to an en-route alternate aerodrome, the operator should use the approved speed as described in Section 3.2.8 of this AMC.

3.2.4 Maximum diversion time

3.2.4.1 In approving the maximum diversion time, the Authority will take into consideration the aeroplane's EDTO significant systems (e.g. limiting time limitation, if any, and relevant to that particular operations) for a particular aeroplane type and the operator's operational and EDTO experience with the aeroplane type, or if relevant, with another aeroplane type or model.

3.2.4.2 For determining the maximum diversion distance to an en-route alternate, the operator should use the approved speed as described in Section 3.2.8 of this Attachment.

3.2.4.3 The operator's approved maximum diversion time should not exceed the most limiting EDTO significant system time limitation identified in the Aeroplane's Flight Manual reduced by an operational safety margin, commonly 15 minutes, specified by the Authority.

3.2.5 EDTO significant systems

3.2.5.1 In addition to the provisions in section 3.1.1 of this Attachment, this section addresses particular provisions for aeroplanes with more than two turbine engines.

3.2.5.2 Consideration of time limitations

3.2.5.2.1 For all operations beyond the EDTO threshold as determined by the Authority, the operator should consider, at time of dispatch and as outlined below, the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane's Flight Manual (directly or by reference) and relevant to that particular operation.

3.2.5.2.2 The operator should check that from any point on the route, the maximum diversion time does not exceed the most limiting EDTO significant system time limitation reduced with an operational safety margin, commonly 15 minutes, specified by the Authority.

3.2.5.2.3 Not applicable. Considerations for the maximum diversion time subject to cargo fire suppression time limitations are considered in 3.3.5.2.2.

3.2.5.2.4 For that purpose, the operator should consider the approved speed as described in Section 3.2.8.2 or consider adjusting that speed with forecast wind and temperature conditions for operations with longer threshold times (e.g. beyond 180 minutes) as determined by the Authority.

3.2.6 En-route alternate aerodromes

3.2.6.1 In addition to the en-route alternate aerodrome provisions described in Section 2.3 of this Attachment the following apply:

a) for route planning purposes, identified en-route alternate aerodromes need to be located at a distance within the maximum diversion time from the route and which could be used if necessary; and

b) in extended diversion time operations, before an aeroplane crosses its threshold time during flight, there should always be an en-route alternate aerodrome within the approved maximum diversion time whose conditions will be at or above the operator's established aerodrome operating minima for the operation during the estimated time of use. If any conditions, such as weather below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action should be determined such as selecting another en-route alternate aerodrome within the operator's approved maximum diversion time.

Note.— En route alternate aerodromes may also be the take off and/or destination aerodromes.

3.2.7 Operational approval procedure

3.2.7.1 In approving an operator with a particular aeroplane type for extended diversion time operations, the Authority should establish an appropriate threshold time and maximum diversion time and in addition to the requirements previously set forth in this Attachment, ensure that:
a) specific operational approval is granted (by the Authority);
b) the operator's past experience and compliance record is satisfactory and the operator establishes the processes necessary for successful and reliable extended diversion time operations and shows that such processes can be successfully applied throughout such operations;
c) the operator's procedures are acceptable based on certified aeroplane capability and adequate to address continued safe operation in the event of degraded aeroplane systems;
d) the operator's crew training programme is adequate for the proposed operation;
e) documentation accompanying the authorization covers all relevant aspects; and
f) it has been shown (e.g. during the EDTO certification of the aeroplane) that the flight can continue to a safe landing under the anticipated degraded operating conditions which would arise from:
1) the most limiting EDTO significant system time limitation, if any, for extended diversion time operations identified in the Aeroplane's Flight Manual directly or by reference; or
2) any other condition which the Authority considers to be equivalent in airworthiness and performance risk.

3.2.8 Conditions to be used when converting diversion times to distances for the determination of the geographical area beyond threshold and within maximum diversion distances

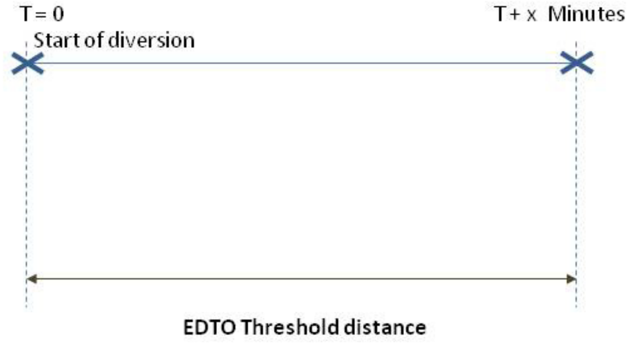
3.2.8.1 For the purpose of this guidance, an approved all-engine-operative (AEO) speed is any all-engine-operative speed within the certified flight envelope of the aeroplane.
Note.— See Section 3.2.5.2.2 of this Attachment for operational considerations.

3.2.8.2 When applying for EDTO an operator should identify, and the Authority should approve the AEO speed(s), considering ISA and still air conditions that will be used to calculate the threshold and maximum diversion distances. The speed that will be used to calculate the maximum diversion distance may be different from the speed used to determine the 60-minute and EDTO thresholds.

3.2.8.3 Determination of the EDTO threshold

3.2.8.3.1 For determining whether a point of the route is beyond the EDTO threshold to an en-route alternate, the operator should use the approved speed (see 3.2.8.1 and 3.2.8.2). The distance is calculated from the point of the diversion followed by cruise for the threshold time as determined by the Authority as shown on the figure 5 below.

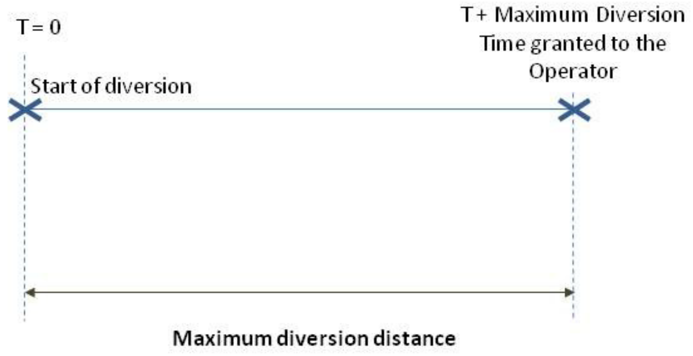
Figure 5: Threshold distance - Aeroplanes with more than two turbine engines



3.2.8.4 Determination of the maximum diversion time distance

3.2.8.4.1 For determining the maximum diversion time distance to an en-route alternate, the operator should use the approved speed (see 3.2.8.1 and 3.2.8.2). The distance is calculated from the point of the diversion followed by cruise for the maximum diversion time as approved by the Authority, as shown of the figure 6 below.

Figure 6: Maximum diversion distance - Aeroplanes with more than two turbine engines



3.2.9 Airworthiness certification requirements for extended diversion time operations beyond the threshold time

3.2.9.1 Not applicable. There are no additional EDTO airworthiness certification requirements for aeroplanes with more than two engines.

3.2.10 Maintaining operational approval

3.2.10.1 In order to maintain the required level of safety on routes where these aeroplanes are permitted to operate beyond the established threshold time, it is necessary that:
a) specific flight dispatch requirements are met;
b) necessary in-flight operational procedures are established; and
c) specific operational approval is granted by the Authority.

3.2.11 Airworthiness modifications and maintenance programme requirements

3.2.11.1 Not applicable. There are no additional EDTO airworthiness or maintenance requirements for aeroplanes with more than two engines.

3.2.12 Examples

3.2.12.1 On establishing the appropriate threshold and approved maximum diversion time for an operator with a particular aeroplane type, the Authority will consider, but not be limited to, the following; the airworthiness certification of the aeroplane, the operator's experience in conducting operations beyond the 60-minute threshold, flight deck crew experience in conducting such operations, the maturity of that operator's flight dispatch system, the communication capability with the operators operational control centre (ACARS, SATCOM, HF, etc.), the robustness of both the operator's standard operating procedures and the familiarity of the crews with those procedures, the maturity of the operator's Safety Management System, the crew training programme and the reliability of the propulsion system. The following examples are based on those considerations and are taken from actual State requirements:

a) State A: This State has established the threshold time based on the capability of the operator and the aeroplane type for an aeroplane with more than two engines at 180 minutes and approved a maximum diversion time of 240 minutes. That operator will need to have specific approval to be further than 180 minutes to an en-route alternate aerodrome (all-engine-operative (AEO) speed in ISA and still air conditions), remain within 240 minutes to an en-route alternate airport and meet the requirements in AUA-OPS 1.245. If that operator with the particular aeroplane type plans a route within the threshold time established by State A (in the above example this is 180 minutes) to an en-route alternate aerodrome, that operator would not require any additional approval from State A and only need to comply with the requirements in AUA-OPS 1.245 and 1.246 if the operation was conducted beyond 60 minutes from en en-route alternate aerodrome.

b) State B: The CAA is approached by an operator who is in the process of expansion, having acquired aeroplane(s) with more than two engines capable of EDTO. The operator submits an application to amend its AOC to include this new aeroplane type on newly granted routes. These routes take the flight beyond 60 minutes to an en-route alternate, thus requiring the establishment of a threshold time and approval of a maximum diversion time. Taking into account:

1) that the operator has not had previous experience with the routes and area of operation;

2) the new aeroplane type;

3) the inexperience of the company and its flight operations/operations control department at planning and dispatching such flights; and

4) the new operating procedures to be established.

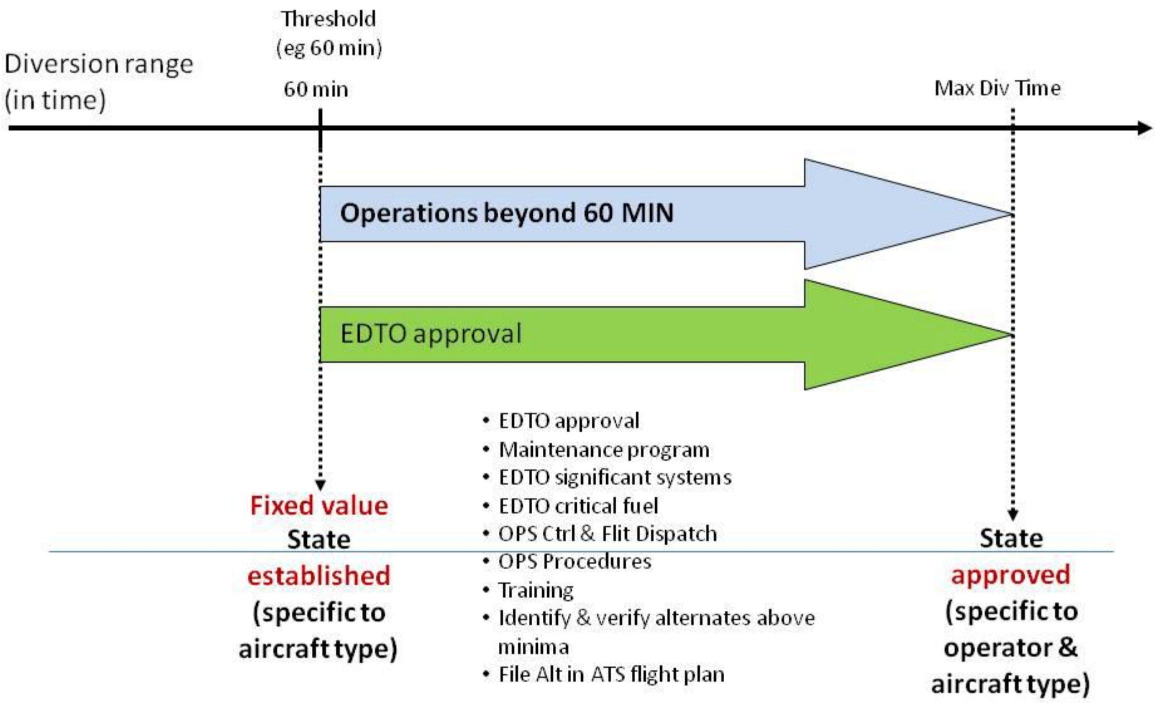
State B determines that the threshold time for Operator B should be limited to 120 minutes and approves a maximum diversion time of 180 minutes. As the operator gains experience with the operation and the procedures over time, the State may amend the initially established threshold time and approved maximum diversion time.

3.3 EDTO for aeroplanes with two turbine engines

3.3.1 General

3.3.1.1 This section addresses provision that apply in addition to those in Sections 2 and 3.1 of this AMC in particular to aeroplanes with two turbine engines.
3.3.1.2 EDTO provisions for aeroplanes with two turbine engines do not differ from the previous provisions for extended range operations by aeroplanes with two turbine engines (ETOPS). Therefore, EDTO may be referred to as ETOPS in some documents.

Figure 7: Generic EDTO graphical representation for aeroplanes with two turbine engines.



3.3.2 Operational and diversion planning principles

3.3.2.1 When planning or conducting, extended diversion time operations, an operator and pilot in command, should normally ensure that:
a) when planning an EDTO flight, the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes or aeroplane performance, are appropriately considered;
b) if an aeroplane engine shutdown, proceed to and land at the nearest (in terms of the least flying time) en-route alternate aerodrome where a safe landing can be made; and
c) in the event of a single or multiple failure of an EDTO significant systems or systems (excluding engine failure), proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety results from any decision made to continue the planned flight.

3.3.2.2 EDTO critical fuel

3.3.2.2.1 An aeroplane with two engines engaged in EDTO operations should carry enough fuel to fly to an en-route alternate aerodrome as described in Section 3.3.6 of this AMC. This EDTO critical fuel corresponds to the additional fuel that may be required to comply with 1.255(c)(3)(iv).

3.3.2.2.2 The following should be considered, using the anticipated mass of the aeroplane, in determining the corresponding EDTO critical fuel:

a) fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, failure of one engine or simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting;

1) the speed selected for the all-engine-operative diversion (i.e. depressurization alone) may be different from the approved one-engine-inoperative speed used to determine the EDTO threshold and maximum diversion distance (see 3.3.8);
2) the speed selected for the one-engine-inoperative diversions (i.e. engine failure alone and combined engine failure and depressurization) should be the approved one-engine-inoperative speed used to determine the EDTO threshold and maximum diversion distance (see 3.3.8);
b) fuel to account for icing;
c) fuel to account for errors in wind forecasting;
d) fuel to account for holding, an instrument approach and landing at the en-route alternate aerodrome;
e) fuel to account for deterioration in cruise fuel burn performance; and
f) fuel to account for APU use (if required).

3.3.2.3 The following factors may be considered in determining if a landing at a given aerodrome is the more appropriate course of action:
a) aeroplane configuration, weight, systems status, and fuel remaining;
b) wind and weather conditions en-route at the diversion altitude, minimum altitudes en-route and fuel consumption to the en-route alternate aerodrome;
c) runways available, runway surface condition, weather, wind, and terrain, in proximity of the en-route alternate aerodrome;
d) instrument approaches and approach/runway lighting available, rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;
e) pilot's familiarity with that aerodrome and information about that aerodrome provided to the pilot by the operator; and
f) facilities for passenger and crew disembarkation and accommodation.

3.3.3 Threshold time

3.3.3.1 In establishing the appropriate threshold time and to maintain the required level of safety, the Authority will consider that:
a) the airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;
b) the reliability of the propulsion system is such that the risk of double engine failure from independent causes is extremely remote;
c) any necessary special maintenance requirements are fulfilled;
d) specific flight dispatch requirements are met;
e) necessary in-flight operational procedures are established; and
f) the operator's previous experience on similar aircraft types and routes.

3.3.3.2 For determining whether a point on a route is beyond the EDTO threshold to an enroute alternate aerodrome, the Operator should use the approved speed as described in Section 3.3.8 of this AMC.

3.3.4 Maximum diversion time

3.3.4.1 In approving the maximum diversion time, the Authority will take into consideration the EDTO certified capability of the aeroplane, the aeroplanes EDTO significant systems (e.g. limiting time limitation, if any, and relevant to that particular operation) for a particular aeroplane type and the operator's operational and EDTO experience with the aeroplane type, or if relevant, with another aeroplane type or model.

3.3.4.2 For determining the maximum diversion distance to an en-route alternate, the operator should use the approved speed as described in Section 3.3.8 of this AMC.

3.3.4.3 The operator's approved maximum diversion time should not exceed the EDTO certified capability of the aeroplane nor the most limiting EDTO significant system time limitation identified in the Aeroplane's Flight Manual reduced by an operational safety margin specified, commonly 15 minutes, by the Authority.

3.3.5 EDTO significant systems

3.3.5.1 In addition to the provisions in section 3.1.1 of this AMC, this section address particular provisions for aeroplanes with two turbine engines.

3.3.5.1.1 The reliability of the propulsion system for the aeroplane-engine combination being certified is such that the risk of double engine failures from independent causes is assessed as provided in the ICAO Airworthiness Manual (Doc 9760) and found acceptable to support the diversion time being approved.
Note.— EDTO may be referred to as ETOPS in some documents.

3.3.5.2 Consideration of time limitations

3.3.5.2.1 For all operations beyond the EDTO threshold as determined by the Authority, the operator should consider, at time of dispatch and as outlined below, the EDTO certified capability of the aeroplane and the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane's Flight Manual (directly or by reference) and relevant to that particular operations.

3.3.5.2.2 The operator should check that from any point on the route, the maximum diversion time at the approved speed as described in Section 3.3.8.2 does not exceed the most limiting EDTO significant system time limitation, other than the cargo fire suppression system, reduced with an operational safety margin, commonly 15 minutes, specified by the Authority.

3.3.5.2.3 The operator should check that from any point on the route, the maximum diversion time, at all engine operating cruise speed, considering ISA and still air conditions, does not exceed the cargo fire suppression system time limitation reduced with an operational safety margin, commonly 15 minutes, specified by the Authority.

3.3.5.2.4 The operator should consider the approved speed as described in 3.3.5.2.2 and 3.3.5.2.3 above or consider adjusting that speed with forecast wind and temperature conditions for operations with longer threshold times (e.g. beyond 180 minutes) as determined by the Authority.

3.3.6 En-route alternate aerodromes

3.3.6.1 In addition to the en-route alternate aerodrome provisions described in Section 2.5 of this AMC the following apply:
a) for route planning purposes, identified en-route alternate aerodromes need to be located at a distance within the maximum diversion time from the route and which could be used if necessary; and
b) in extended diversion time operations, before an aeroplane crosses its threshold time during flight, there should always be an en-route alternate aerodrome within the approved maximum diversion time whose conditions will be at or above the operator's established aerodrome operating minima for the operation during the estimated time of use. If any conditions, such as weather below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action should be determined such as selecting another en-route alternate aerodrome within the operator's approved maximum diversion time.

3.3.6.2 During flight preparation and throughout the flight the most up-to-date information should be provided to the flight crew on the identified en-route alternate aerodromes, including operational status and meteorological conditions.
Note.— En route alternate aerodromes may also be the take off and/or destination aerodromes.

3.3.7 Operational approval procedure

3.3.7.1 In approving an operator with a particular aeroplane type for extended diversion time operations, the Authority will establish an appropriate threshold time and approve a maximum diversion time and in addition to the requirements previously set forth in this AMC, ensure that:

a) specific operational approval is granted (by the Authority);
b) the operator's past experience and compliance record is satisfactory and the operator establishes the processes necessary for successful and reliable extended diversion time operations and shows that such processes can be successfully applied throughout such operations;
c) the operator's procedures are acceptable based on certified aeroplane capability and adequate to address continued safe operation in the event of degraded aeroplane systems;
d) the operator's crew training programme is adequate for the proposed operation;
e) documentation accompanying the authorization covers all relevant aspects; and
f) it has been shown (e.g. during the EDTO certification of the aeroplane) that the flight can continue to a safe landing under the anticipated degraded operating conditions which would arise from:
1) the most limiting EDTO significant system time limitation, if any, for extended diversion time operations identified in the Aeroplane's Flight Manual directly or by reference; or
2) total loss of engine generated electric power; or
3) total loss of thrust from one engine; or
4) any other condition which the Authority considers to be equivalent in airworthiness and performance risk.

3.3.8 Conditions to be used when converting diversion times to distances for the determination of the geographical area beyond threshold and within maximum diversion distances

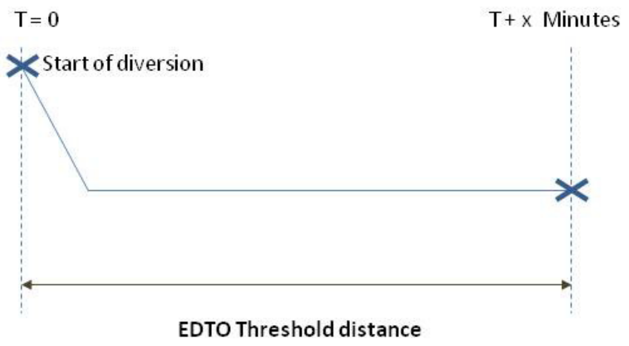
3.3.8.1 For the purpose of this guidance, an “approved one-engine-inoperative (OEI) speed” is any one-engine-inoperative speed within the certified flight envelope of the aeroplane.
Note.— See Section 3.3.5.2.2 of this Attachment for operational considerations.

3.3.8.2 When applying for EDTO an operator should identify, and the Authority should approve the OEI speed(s) that will be used to calculate the threshold and maximum diversion distances considering ISA and still air conditions. The identified speed that will be used to calculate the maximum diversion distance should be the same one used to determine fuel reserves for OEI diversions. This speed may be different from the speed used to determine the 60 minutes and EDTO thresholds.

3.3.8.3 Determination of the EDTO threshold

3.3.8.3.1 For determining whether a point of the route is beyond the EDTO threshold to an en-route alternate, the operator should use the approved speed (see 3.3.8.1 and 3.3.8.2). The distance is calculated from the point of the diversion followed by cruise for the threshold time as determined by the Authority as shown on the figure 8 below. For the purposes of computing distances, credit for driftdown may be taken.

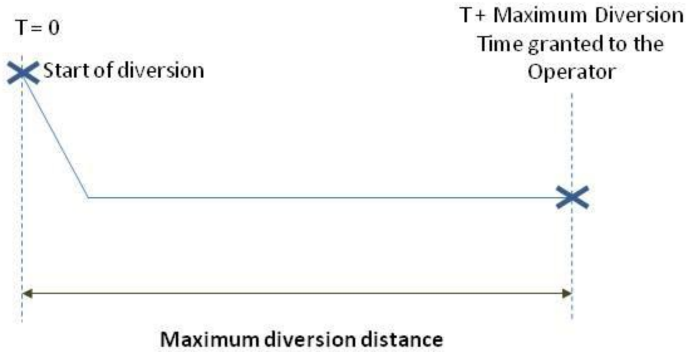
Figure 8: Threshold distance - Aeroplanes with two turbine engines



3.3.8.4 Determination of the maximum diversion time distance

3.3.8.4.1 For determining the maximum diversion time distance to an en-route alternate, the operator should use the approved speed (see 3.3.8.1 and 3.3.8.2). The distance is calculated from the point of the diversion followed by cruise for the maximum diversion time as approved by the Authority, as shown in the figure 9 below. For the purposes of computing distances, credit for driftdown may be taken.

Figure 9: Maximum diversion distance - Aeroplanes with two turbine engines



3.3.9 Airworthiness certification requirements for extended diversion time operations beyond the threshold time

3.3.9.1 During the airworthiness certification procedure for an aeroplane type intended for extended diversion time operations, special attention should be paid to ensure that the required level of safety will be maintained under conditions which may be encountered during such operations, e.g. flight for extended periods following failure of an engine and/or aeroplanes EDTO significant systems. Information or procedures specifically related to extended diversion time operations should be incorporated into the Aeroplane's Flight Manual, Maintenance Manual, EDTO CMP (configuration, maintenance and procedure) document or other appropriate document.

3.3.9.2 Aeroplane manufacturers should supply data specifying the aeroplanes EDTO significant systems and where appropriate, any time-limiting factors associated with those systems.
Note 1.— EDTO may be referred to as ETOPS in some documents.

3.3.10 Maintaining operational approval

3.3.10.1 In order to maintain the required level of safety on routes where these aeroplanes are permitted to operate beyond the established threshold time, it is necessary that:
a) the airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;
b) the reliability of the propulsion system is such that the risk of double engine failures from independent causes is extremely remote, assessed as provided in the ICAO Airworthiness Manual (Doc 9760) and found acceptable to support the diversion time being approved;
c) any necessary special maintenance requirements are fulfilled;
d) specific flight dispatch requirements are met;
e) necessary in-flight operational procedures are established; and
f) specific operational approval is granted by the Authority.
Note 1.— EDTO may be referred to as ETOPS in some documents.

3.3.11 Airworthiness modifications and maintenance programme requirements

3.3.11.1 Each operator's maintenance programme should ensure that:
a) the titles and numbers of all airworthiness modifications, additions and changes which were made to qualify aeroplane systems for extended diversion time operations are provided to the applicable Authorities (State of Registry and, where applicable, to the State of the Operator);
b) any changes to maintenance and training procedures, practices or limitations established in the qualification for extended diversion time operations are submitted to the applicable Authorities (State of the Operator and, where applicable, to the State of Registry) before such changes are adopted;
c) a reliability monitoring and reporting programme is developed and implemented prior to approval and continued after approval;
d) prompt implementation of required modifications and inspections which could affect propulsion system reliability is undertaken;
e) procedures are established which prevent an aeroplane from being dispatched for an extended diversion time operation after engine shutdown or EDTO significant system failure on a previous flight until the cause of such failure has been positively identified and the necessary corrective action is completed. Confirmation that such corrective action has been effective may, in some cases, require the successful completion of a subsequent flight prior to dispatch on an extended diversion time operation;
f) a procedure is established to ensure that the airborne equipment will continue to be maintained at the level of performance and reliability required for extended diversion time operations; and
g) a procedure is established to minimize scheduled or unscheduled maintenance during the same maintenance visit on more than one parallel or similar EDTO significant system. Minimization can be accomplished by staggering of maintenance tasks, performing and/or supervising maintenance by a different technician, or verifying maintenance correction actions prior to the airplane entering an EDTO threshold.

3.3.12 Examples

3.3.12.1 On establishing the appropriate threshold and approved maximum diversion time for an operator with a particular aeroplane type, the Authority will consider, but not be limited to, the following; the airworthiness certification of the aeroplane, the operator's experience in conducting operations beyond the 60-minute threshold, flight deck crew experience in conducting such operations, the maturity of that operator's flight dispatch system, the communication capability with the operator's operational control centre (ACARS, SATCOM, HF, etc.), the robustness of both the operator's standard operating procedures and the familiarity of the crews with those procedures, the maturity of the operator's

Safety Management System, the crew training programme and the reliability of the propulsion system. The following examples are based on those considerations and are taken from actual State requirements:
a) State A: This State has established the threshold time based on the capability of the operator and the aeroplane type for a twin engine aeroplane at 60 minutes and approved a maximum diversion time of 180 minutes. That operator will need to have specific approval to be further than 60 minutes to an en-route alternate aerodrome (calculated in ISA conditions and still air at the one-engine inoperative cruise speed), remain within 180 minutes to an en-route alternate airport and meet the requirements in AUA-OPS 1.245 and 1.246. If that operator with the particular aeroplane type plans a route within the threshold time established by State A (in the above example this is 60 minutes) to an en-route alternate airport, that operator by definition would not be conducting an extended diversion time operation and thus would not need to meet any of the provisions in AUA-OPS 1.245 and 1.246.

b) State B: This State has established the threshold time based on the capability of the operator and the aeroplane type for a twin engine aeroplane at 90 minutes and approved a maximum diversion time of 180 minutes, that operator will need to have specific approval to be further than 90 minutes to an en-route alternate aerodrome (calculated in ISA conditions and still air at the one-engine inoperative cruise speed), remain within 180 minutes to an en-route alternate airport and meet the requirements in AUA-OPS 1.245 and 1.246. If that operator with the particular aeroplane type plans a route within the threshold time established by the Authority (in the above example this is 90 minutes) to an en-route alternate airport, that operator would not require any additional approval from State B and only need to comply with the requirements in AUA-OPS 1.126.

c) The same State B; This State is approached by an operator who is in a process of expansion, having acquired twin engine aeroplane(s) capable of EDTO. The operator submits an application to amend its AOC to include this new aeroplane type on newly granted routes. These routes take the flight beyond 60 minutes to an en-route alternate, thus requiring the establishment of a threshold time and approval of a maximum diversion time. Taking into account:
1) that the operator has not had previous experience with the routes and area of operation;
2) the new aeroplane type;
3) the inexperience of the company and its flight operations/operations control department at planning and dispatching such flights; and
4) the new operating procedures to be established.
State B determines that the threshold time for this operator should be limited to 60 minutes and approves a maximum diversion time of 120 minutes.
As this operator gains experience with the operation and the procedures over time, the State may amend the initially established threshold time and approved maximum diversion time.